S/M No. : DSP115BEF0

Service Manual

42" PLASMA PDP MONITOR

CHASSIS : SP-115

Model : DP-42GM/GP
DP-42SM/SP
DP-42WM/WP

✔ **Caution**

: In this Manual, some parts can be changed for improving, their performance without notice in the parts list. So, if you need the latest parts information,please refer to PPL(Parts Price List) in Service Information Center (http://svc.dwe.co.kr).

DAEWOO ELECTRONICS Corp.

http : //svc.dwe.co.kr Nov. 2002

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1. Safety Precautions

(1) When moving or laying down a PDP Set, at least two people must be working. Avoid any impact towards the PDP Set.

(2) Do not leave the broken PDP Set on for a long time. To prevent any further damages, after check the broken Set's condition, make sure to turn the power (AC) off.

(3) When opening the BACK COVER, turn off the power (AC) to prevent electric shock. When a PDP is on, high voltage and high current exist inside the Set.

(4) When loosening screws, check the connecting position and type of the screw. Sort out the screws and store them separately. Because screws holding PCB are working as electric circuit GROUNDING, make sure to check if any screw is missing when assembling.

(5) If you open the BACK COVER, you will see a Panel Gas Exhaust Tube (refer to FIG<10>). If this part is damaged, entire PDP PANEL must be replaced. Therefore, when working, be careful not to damage this part.

(6) A PDP Set contains different kind of connector cables. When connecting or disconnecting connector cables, check the direction and position of the cable beforehand.

(7) When disconnecting connectors, unplug the connectors slowly with care. Especially when connecting/disconnecting FFC (film) cables or FPC cables, do not unplug the connectors too much instantaneously or strongly, and always handle the cables with care. (Refer to FIG<10>, FIG<11>)

(8) Connectors are designed so that if the number of pins or the direction does not match, connectors will not fit. When having problem in plugging the connectors, make sure to check their kind, position, and direction.

2. Product Specification

2-1. PRODUCT SPECIFICATION

ITEM	SPECIFICATION	REMARK
1. GENERAL		
1-1. MODEL NO	DSP-4280GM(G, W, S)	
1-2. CHASSIS NO	SP-115	
1-3. SCREEN SIZE	42"(16:9)	
1-4. COUNTRY	WORLD WIDE	
1-5. RESOLUTION	853(H) X 480(V)	
1-6. REMOCON TYPE	R-V28A (E)	
1-7. SAFETY STANDARD	UL, C-UL, CE, CB, FCC(CLASS B), CE(CLASS B), K-mark	
2. MECHANICAL		
2-1. APPEARANCE		
1) WITHOUT STAND	WxHxD=1,039 x 628 x 80 mm	
2) WITH STAND	WxHxD=1,039 x 725 x 320 mm	
3) CARTON BOX	WxHxD=1,256 x 800 x 327 mm	
2-2. WEIGHT		
1) WITHOUT STAND	29.9 Kg	
2) WITH STAND	36.8 Kg	
3. ELECTRICAL		
3-1. VIDEO INPUT	COMPOSITE(NTSC, PAL, SECAM, PAL-M/N, NTSC4.43) & S-VHS(50/60Hz Y/C) 2 sets	
3-2. DTV/DVD INPUT	1080 i, 720P, 480P , 480i (Y, Pb/Cb, Pr/Cr COMPONENT SIGNAL) 2 sets	
3-3. PC INPUT	VGA ~ UXGA (15 PIN D-SUB) 1 sets	
3-4. SOUND INPUT	2 sets for VIDEO, 2 sets for DTV/DVD, 1 set for PC	
3-4. SPEAKER OUTPUT	8W(R) + 8W(L)	
3-5. POWER REQUIREMENT	AC 100V~240V, 50/60Hz	
3-6. POWER CONSUMPTION	320W	
3-8. RS-232 CONTROL	RS-232 Communication (for SOFTWARE UPGRADE)	
3-9. FUNCTION		
1) SCALING	PC: H/V SIZE and POSITION Adjusting VIDEO/DTV/DVD : NOMAL, 16:9, PANORAMA, ENLARGE LB, ENLARGE LBS	
2) ZOOM	20 Scale ZOOMING & PANING	
3) OSD	Support 11 Languages	
4) OTHERS	STILL, SLEEP MODE, SOUND MODE	

Product Specification

ITEM	SPECIFICATION	REMARK
4. OPTICAL		
4-1. SCREEN SIZE	42"(106Cm) DIAGONAL	
4-2. ASPECT RATIO	16:9	
4-3. NUMBER OF PIXELS	853(H)X480(V)	
4-4. DISPLAY COLOR	16.77 Million Colors (8BIT per each R,G,B)	
4-5. PIXEL PITCH	1.08(H)X1.08(V)	
4-6. PEAK LUMINANCE	300cd/㎡(WITH FILTER GLASS)	
4-7. CONTRAST RATIO	3000:1	
4-8. VIEWING ANGLE	Over 160 degree (VERTICAL / HORIZONTAL)	
5. USERCONTROL & ACCESSORIES		
5-1 CONTROL BUTTON(SET)	AC POWER BUTTON(PUSH-PULL S/W) MENU, SELECT, UP, DOWN, LEFT, RIGHT(SOFT S/W)	
5-2. REMOTE CONTROL(R-V28)	POWER, INPUT SELECT, DISPLAY, ZOOM-,ZOOM+, MENU, UP, DOWN, VOLUME, FREEZE, SCREEN MODE, SOUND MODE, SLEEP	
5-3. ACCESSORIES	REMOCON CONTROLLER, BATTERY, INSTRUCTION MANUAL, A/V CABLE, STAND, WALL HANGER, SPEAKER R/L	

2-2. Available Input Signal

(1) PC

Resolution	H Freq. (KHz)	V Freq. (Hz)	Remark	Patt No.
640x350	31.469	70.1	IBM	203
	37.861	85.1	VESA	11
640x400	24.823	56.4	NEC	15
	30.48	60.0	PGA	871
	31.469	70.1	IBM (DOS)	204
	37.861	85.1	VESA	16
640x480	31.469	59.9	DOS	17
	35	66.7	Macintosh	18
	37.861	72.8	VESA	19
	37.5	75.0	VESA	20
	39.375	75.0	IBM	21
	43.269	85.0	VESA	22
720x400	31.47	60.0	VGA	876
	31.469	70.1	IBM	13
	37.927	85.1	VESA	14
720X480	31.54	60.0	480P	953
720X576	15.63	25.0	PAL	950
800x600	35.156	56.3	VESA	23
	35.16	57.2	VESA	24
	37.879	60.3	VESA	24
	48.077	72.2	VESA	25
	46.875	75.0	VESA	26
	53.674	85.1	VESA	27
832x624	49.726	74.0	Macintosh	28
1024x768	48.193(48.077)	59.3(59.8)	Macintosh(OAK)	29
	48.363	60.0	VESA	30
	53.95	66.1	XGA	890
	56.476	70.1	HP&VESA	31
	60.241	74.9(74.6)	Macintosh	32
	60.023	75.0	VESA	33
	68.677	85.0	VESA	34
	80.66	100.0	Fujitsu	939
	70.84	84.0	SUN	926
1152X864	54	60.0	VAX	936
	63.851	70.0	VESA	35
	67.5	75.0	VESA	36
	77.094	85.0	VESA	37
1152x900	61.796	66.0	SUN	38
	71.713	76.0	SUN	39
1280X720	45	60.0	720P	954
1280X960	60	60.0	VESA	40
	75	75.0	VESA	41
	85.938	85.0	VESA	42

Product Specification

Resolution	H Freq. (KHz)	V Freq. (Hz)	Remark	Patt No.
1280X1024	46.433	43.4	VESA	205
	63.981	60.0	VESA	44
	70.66	66.5	VAX	937
	74.88	70.0	NEC	921
	78.125	72.0	HP & HITA	206
	78.855	74.1	Sony & NEC	46
	79.976	75.0	VESA	47
	81.13	76.1	SUN	927
	91.146	85.0	VESA	48
1600X1200	62.5	48.0	VESA	
	75	60.0	VESA	50
	81.25	65.0	VESA	862
	87.5	70.0	VESA	863
	93.75	75.0	VESA	864
	100	80.0	VESA	865

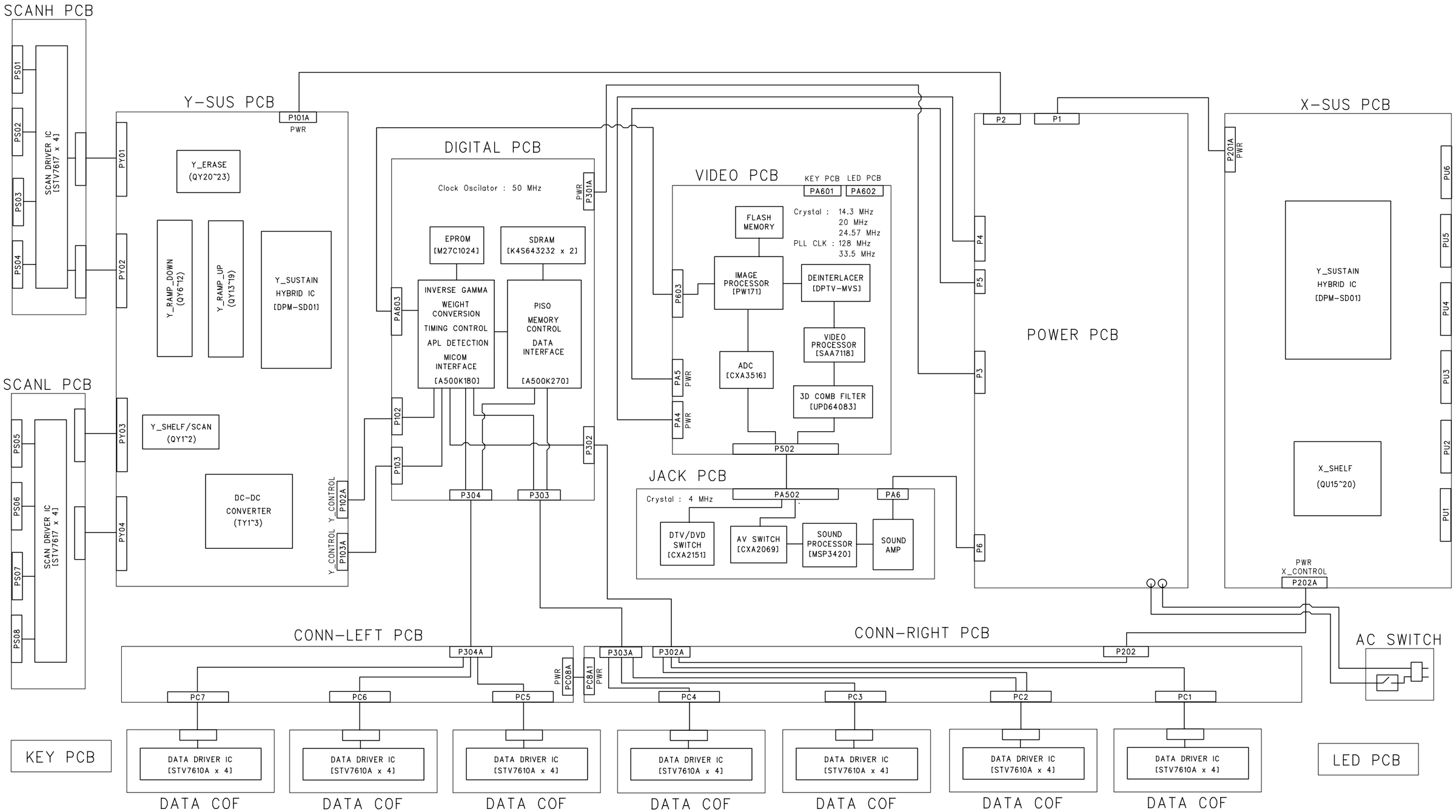
(2) DTV
-1080i/ 60 Hz
-720P / 60 Hz
-480P / 60 Hz

(3) VIDEO
-PAL, PAL-M, PAL-N
-NTSC , NTSC4.43
- SECAM

3. BLOCK DIAGRAM

[DSP-4280GM BLOCK DIAGRAM]

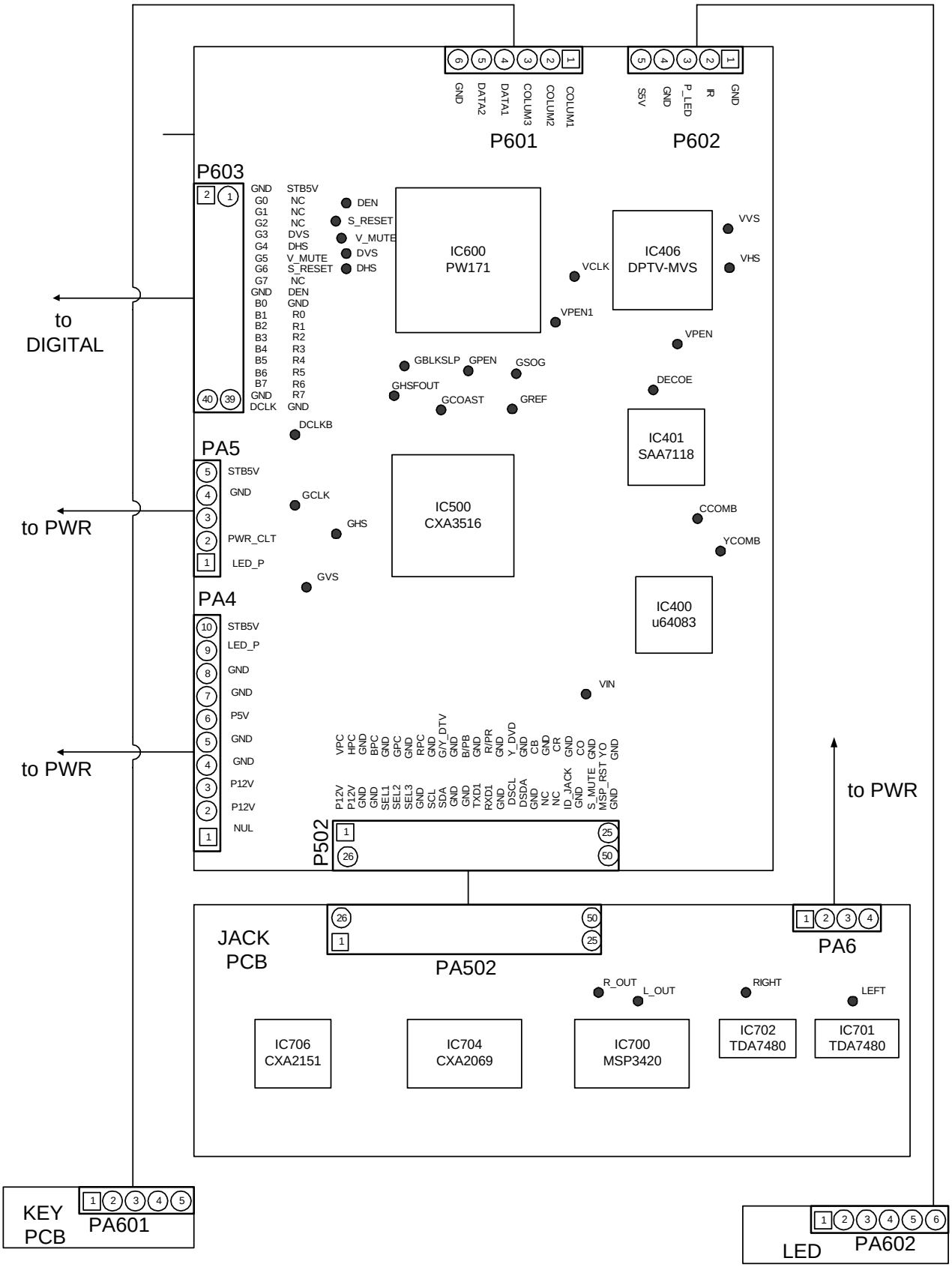
[MP / 2002. 8. 20]



4. Description Of Each BLOCK

4-1. A/V BLOCK

4-1-1. A/V BLOCK DIAGRAM



4-1-2.VIDEO PCB

- PROCESS Various Signal (PC, COMPONENT, COMPOSITE) to produce 24BIT DIGITAL output

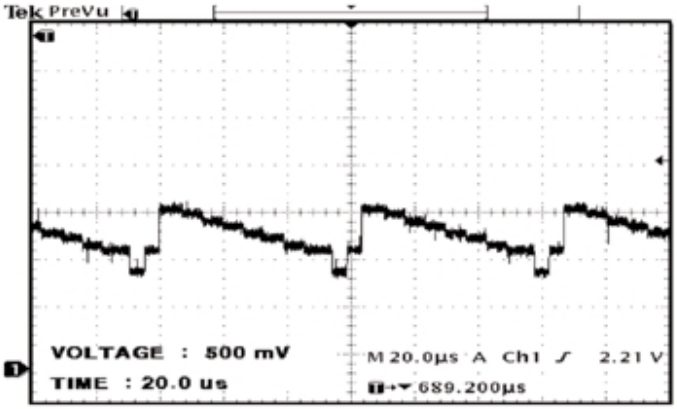
1) IC and TP

(1) IC400(UPD64083)

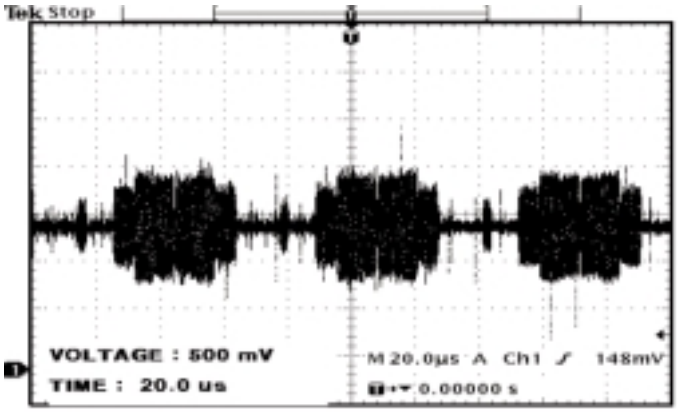
-Using 3D COMBFILTER to separate COMPOSITE signal to Brightness Signal(Y) and Color Signal(C)

*TP (Input : COLOR BAR PATTERN)

A. YCOMP : Brightness Signal(Y)



B. CCOMP : Color Signal (C)



(2) IC401 (SAA7118E)

-Receive NTSC, SECAM, PAL VIDEO by COMPOSITE(V) , S-VHS(Y.C) COMPONENT (Y Cb Cr) and process signal

*TP

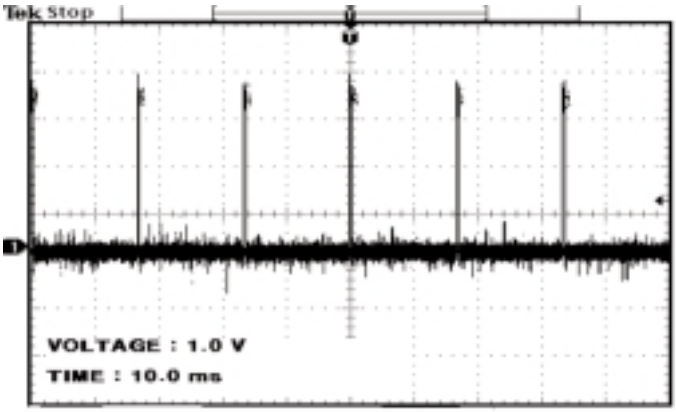
A. DECOE : CHIP ENABLE part. When signal process is done by IC401, output 3.3V DC LEVEL

(3) IC406(DPTV-MVS)

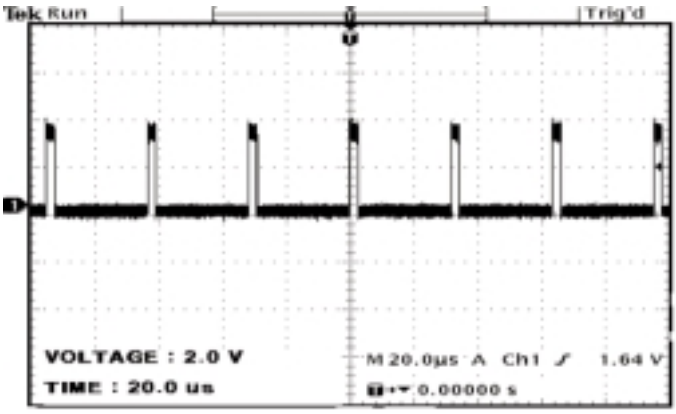
-A Scan Rate Converter which converts Interlace signal into Progressive signal

*TP

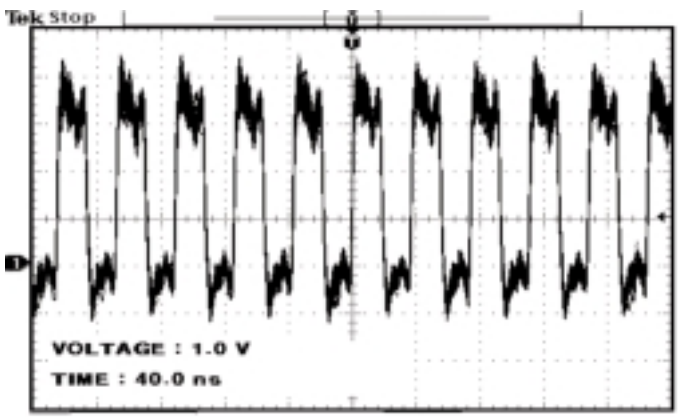
A. VVS : VERTICAL SYNC (output by DPTV-MVS)



B. VHS : HORIZONTAL SYNC (output by DPTV-MVS)



C. VCLK : CLOCK (output by DPTV-MVS)

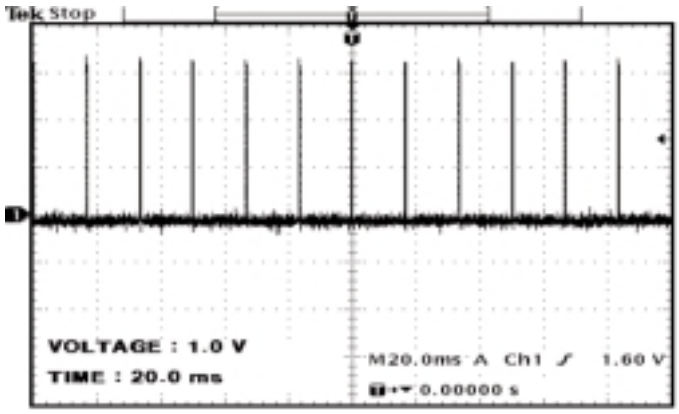


(4) IC500(CXA3516R)

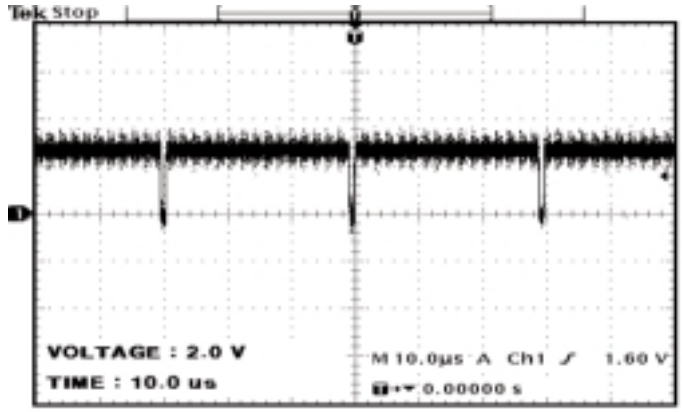
-3-channel 8-bit 165MSPS A/D converter which process PC , DTV signal

* TP

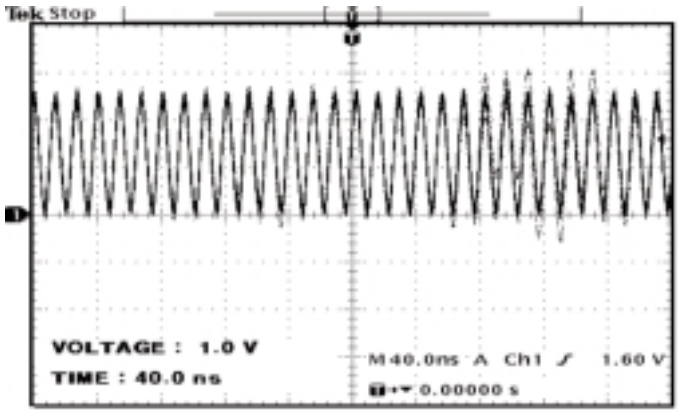
A. GCOAST : COAST CONTOL Signal for PLL (input by CXA3516)



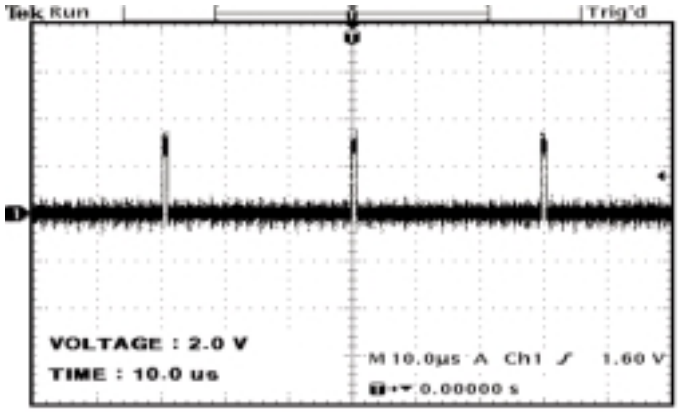
B .GHS : HORIZONTAL SYNC for GRAPHIC (output by CXA3516)



C. GCLK : CLOCK for GRAPHIC (output by CXA3516)



D. GFBK : SYNC for PLL

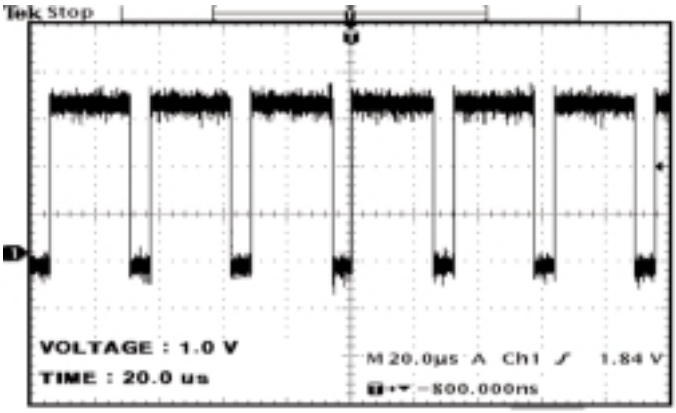


(5) IC600(PW171)

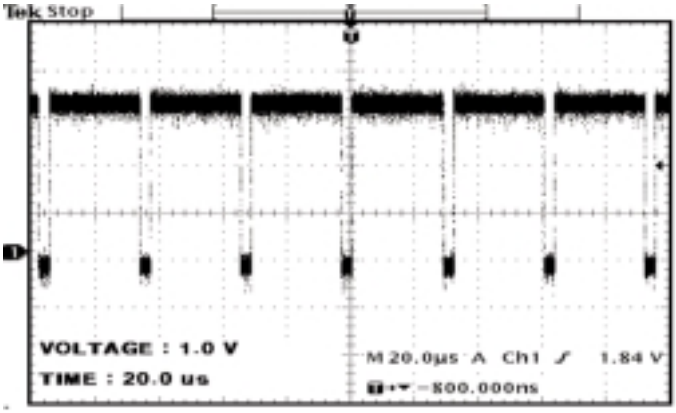
- Image processor IC

*TP

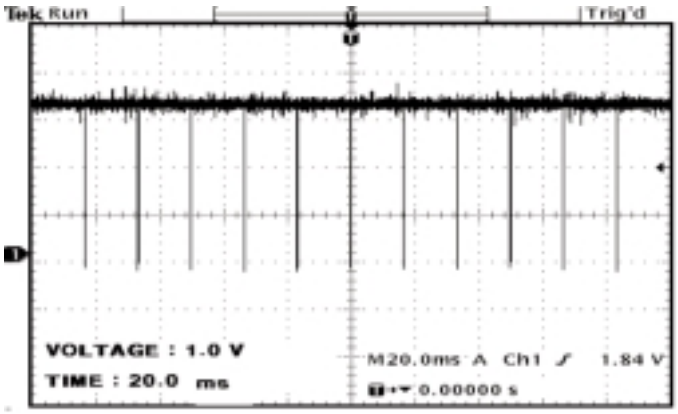
A. DEN : DATA ENABLE (output by PW171)



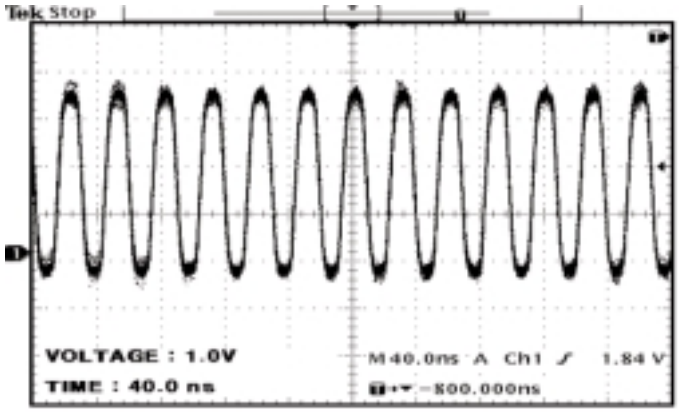
B. DHS : HORIZONTAL SYNC (output by PW171)



C.DVS : VERTICAL SYNC for DISPLAY (output by PW171)



D. DCLKB : CLOCK for DISPLAY (output by PW171)



4-1-3. JACK PCB

- Separate and process various VIDEO and AUDIO signal

(1) IC706(VIDEO /SYNC SELECTOR)

- This chooses Y Cb/Pb Cr/Pr or RGB signal to output Y Cb/Pb Cr/Pr, to separate SYNC, and to perform SYNC COUNTER.

(2) IC704(7_INPUT 3_OUTPUT AUDIO/VIDEO SWITCH)

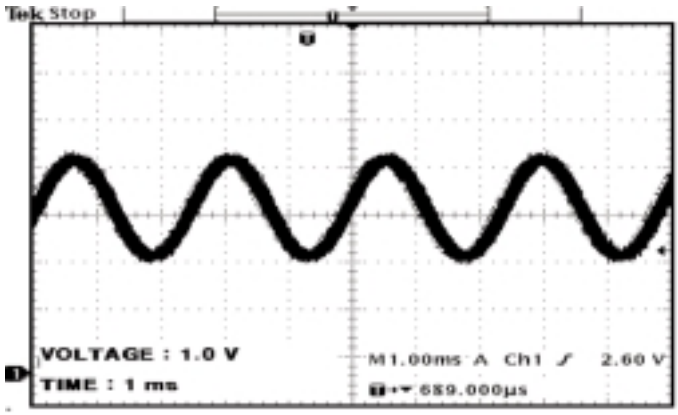
- The IC perform AUDIO or VIDEO SWITCHING

(3) IC700(MULTI STANDARD SOUND PROCDSSOR)

-AUDIO SINGNAL VOLUME control, EQUALIZER control

*TP

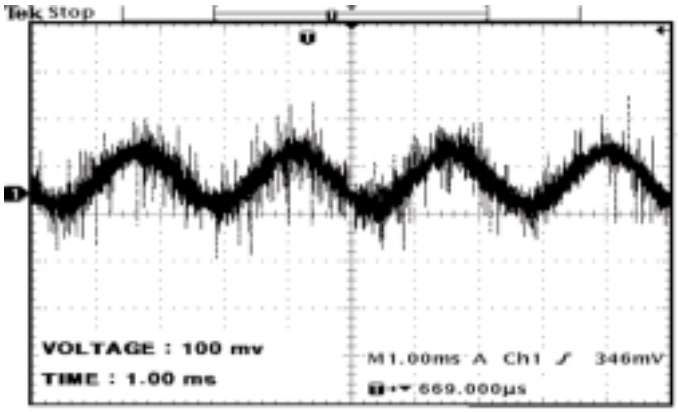
R_OUT(L_OUT) : AUDIO SIGNAL that goes into MSP3420 before AUDIO PROCESSING



(4) IC701 .IC700 (TDA 7480)

*TP

A. RIGHT(LEFT) :AMP input signal before 30dB amplification

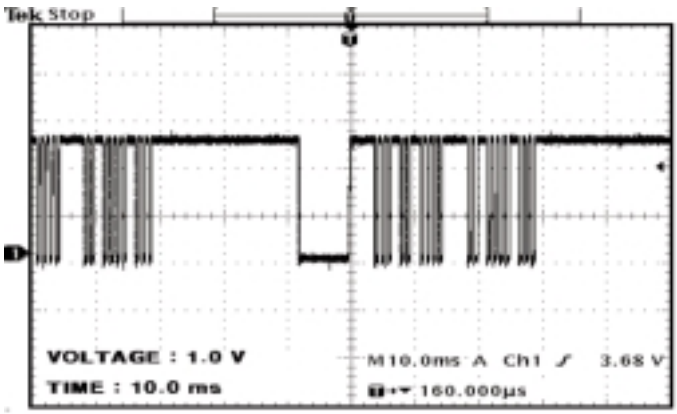


4-1-4.KEY PCB

- Input PCB using KEY

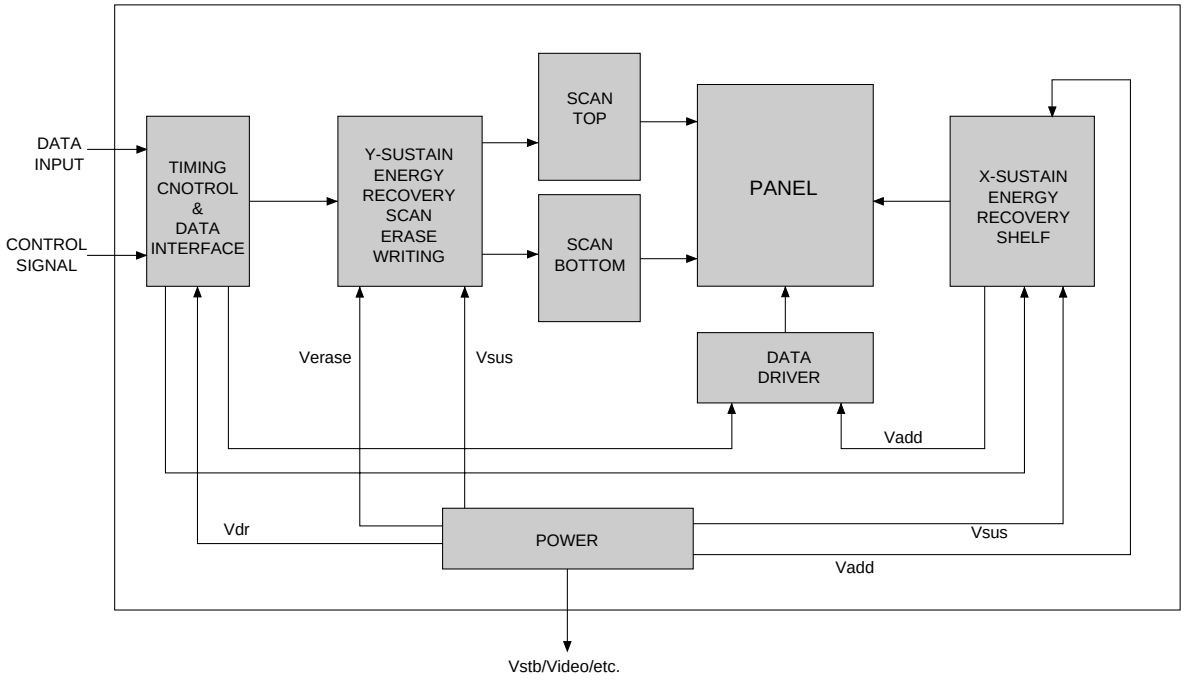
4-1-5.LED PCB

- PCB for REMOCON CONTROL



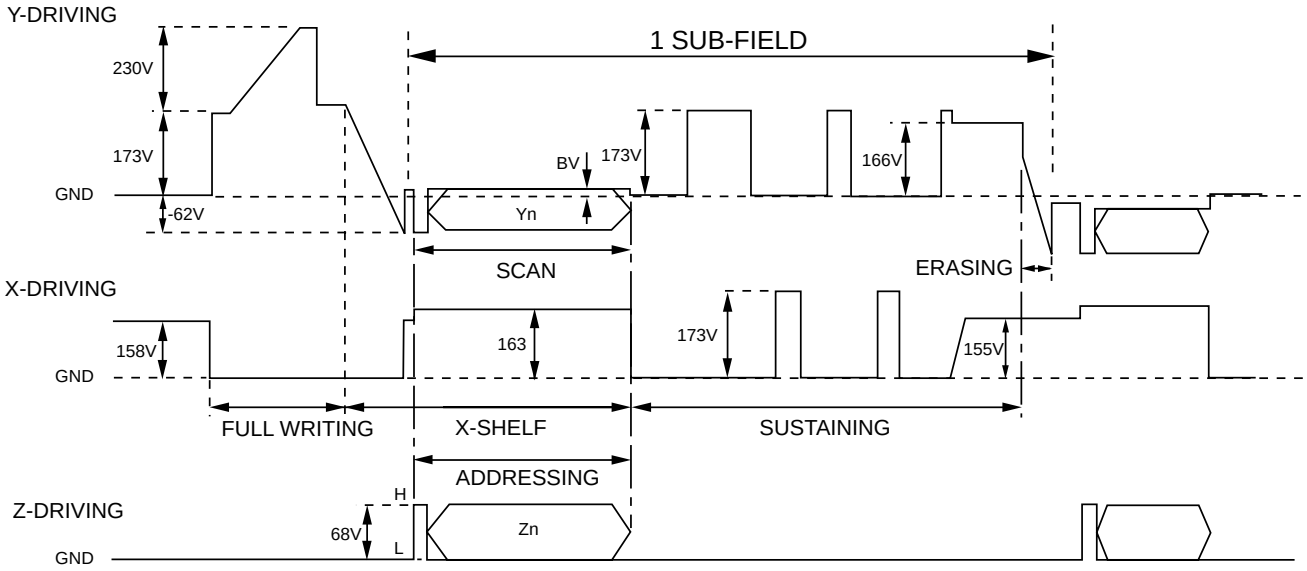
4-2 DRIVING BLOCK

4-2-1. Driving BLOCK DIAGRAM



Driving circuit block looks like above diagram. First, within the Digital-board, timing control / data interface signals input to Y / X / DATA-board. Also, low voltage and high voltage powers such as 15V / 5V / Vsus / Yer / Vadd are supplied. SCAN is divided into two PCB(upper and lower) and DATA driver can drive 7 COF module. Also Connection-board which is located at the lower part of the panel, is divided into two PCB. It transfer 5V / Vadd power supply as well as various Y / X / DATA-board. Vadd power supply is transferred from Power module to X-board through Connection-board to Data driver.

4-2-2. Driving Waveform



PDP Driving signal is largely divided into three(Y, X, Z) as shown above. They are outputs of Y-board, X-board, DATA-board (COF) respectively. Each Sub-field is divided into ADDRESSING, SUSTAINING, ERASING parts. FULL WRITE pulse from Y-board adds once per frame(≅16ms).

1) FULL WRITING

- It is a process that in order to display new image, every cell's condition must be uniformed to erase wall charge made by previous discharge and make new wall charge for next address discharge. Ramp shape signal is added to supply every cell uniform wall charge.
- To decrease Background luminescence and improve contrast, it is applied once per frame.
- Full Writing signal output by Y-board is Vsus electric potential supplied by power module plus ramp-shape output signal made by DC-DC Converter(TY1).

2) ADDRESSING

- Previous to SUSTAINING, it is procedure to select charging cell for image display.
- In other words, it is the stage to make wanted cell to form wall charge.
- During this stage, SCAN block operate in Y-board and SHELF block (X_HIGH) in X-board.

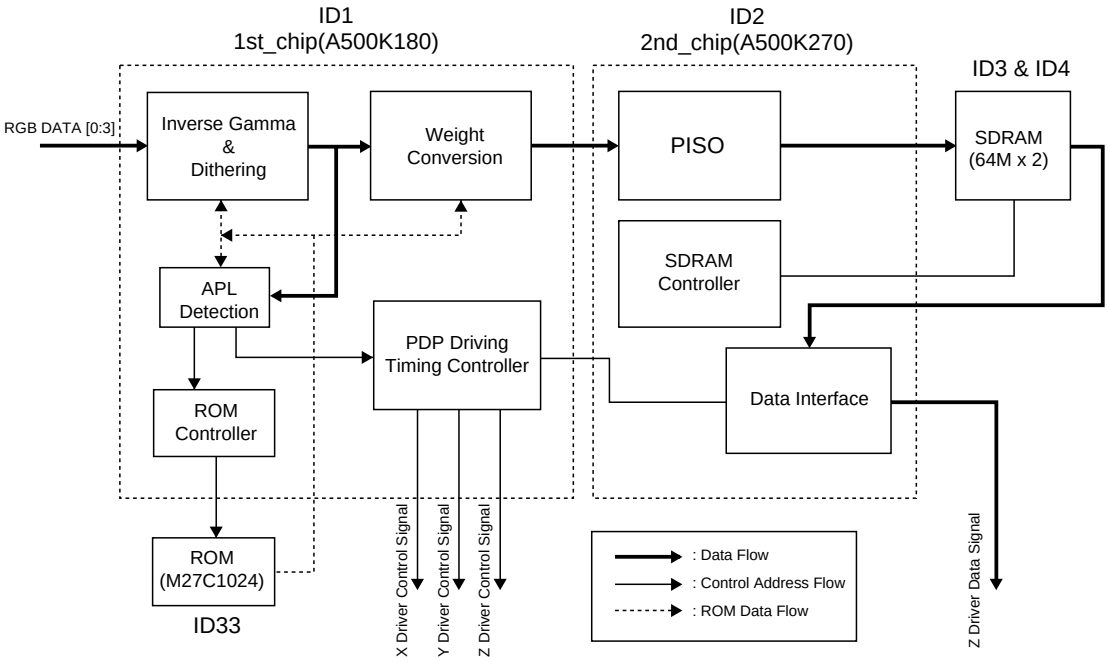
3) SUSTAINING

- After the Addressing period, this stage is to add Sustaining pulse to selected cell to make the SUSTAINING discharge continue.
- For each X, Y-board sustain block, opposite-polarity rectangular pulse which have ER_H→SUS_H →ER_L→SUS_L order, is distributed to Panel's X,Y electrode at a constant frequency.

4) ERASING

- Removing operation for Electrical discharge inside each cell to address new data in next Sub-field. It is a Ramp output signal similar to Full Writing signal.
- Ramp-down block operates in Y-board and Shelf block (X_N_SHELF) operates in X-board.

4-2-3. DIGITAL PCB



<DSP-4280GM Digital B/D Block Diagram>

1. Digital PCB's Main Part

(1)Actel FPGA A500K180-PQ208 : 1 EA

- Location No. : ID1
- Power : Internal 2.5V, I/O 3.3V
- Package : PQFP 208
- Typical Gates : 150,000
- User I/O : 164

(2)Actel FPGA A500K270-BG456 : 1 EA

- Location No. : ID2
- Power : Internal 2.5V, I/O 3.3V
- Package : BGA 456
- Typical Gates : 215,000
- User I/O : 362

(3)SDRAM(K4S643232E-TC70 86pin TSOP) : 2 EA

- Location No. : ID3~4
- Power : 3.3V
- Size : 64 M (512K * 32 bit * 4 Banks)

(4)50MHz Clock Oscillator : 1 EA
- Location No. : XD1
- Power : 3.3V

(5)Buffer IC(74LCX541) : 17 EA
- Location No. : ID9~25
- Power : 5V
- Input Voltage : 3.3V
- Output Voltage : 5V

(6)Buffer IC(74LCX541) : 4 EA
- Location No. : ID5~8
- Power : 3.3V
- Input/Output Voltage : 3.3V

(7)EPROM(M27C1024-PLCC44) : 1 EA
- Location No. : ID33
- Power : 5V
- Input Voltage : 3.3V
- Output Voltage : 5V

(8)2.5V Regulator(LP3964EMP-2.5)
- Location No. : ID32
- Input Voltage : 5V
- Output Voltage : 2.5V

(9)EMI Reduction IC (P2040)
- Location No. : ID34
- Power : 3.3V

2. Data Flow

(1)Input from Video PCB
- 8bit Data per each R,G,B (synchronized by DCLK)
- DVS, DHS, DEN, S_RESET, V_MUTE, DCLK(33.5 MHz)

(2)Inverse Gamma & Dithering Block
- After mapping input data according to "Reverse Gamma Correction Table", execute "Dithering Process".

(3)Weight Conversion Block
- Map input data according to "Weight Conversion Table", which is based on optimum PDP Driving Weight Pattern.

(4)ROM & ROM Controller Block

- ROM contains "Reverse Gamma Correction Table", "Weight Conversion Table", "APL Table" and so on. Rom Controller Block generate Address & Control signal for receiving these data from ROM

(5)PISO(Parallel Input Serial Output) Block

- Load 10 pixels per each R,G,B data with parallel type and shift them with serial type in order of Weight (LSB first). These shifted data is stored in "Internal Memory of A500K270(ID2) with based on DCLK(33.5MHz). After that, those data go into "External Frame Memory (SDRAM)" in order of Weight with based on CLK50M. In other words, PISO Block execute three steps "Data Load → Data Shift & Internal Memory Write → Internal Memory Read & External SDRAM Write " successively. To process with real time, there are three PISO Blocks.

(6)SDRAM & SDRAM Control Block

- Generate Address/Control signals for SDRAM. There are 2 SDRAMs (64M 32-bit SDRAM), which store 1 Frame's R,G,B data in order of Weight respectively to process with real time.

(7)Data Interface Block

- R,G,B data ouput from SDRAM is stored by line in Data Interface Block. These data is output in order matched by Data Driver IC(Z Driver IC)'s input sequence. Our PDP has 853 Data Lines per each R,G,B, and need 853*3=2559 bit 's storage. To process with real time, actually need 2559*2=5118 bit' s storage.

3. PDP Driving Timing Control

(1)X-SUS Driving Control Signal Block

- Generate Control Signals to drive X-SUS PCB. There are 6 Control Signals as follows.
- X_SUSH, X_SUSL, X_ERH, X_ERL, X_HIGH, X_NSHELF

(2)Y-SUS Drving Control Signal Block

- Generate Control Signals to drive Y-SUS PCB & Scan Drvier IC. There are 12 Control Signals as follows.
- Y_SUSH, Y_SUSL, Y_ERH, Y_ERL, Y_SC20_2, Y_SC20_3, Y_SC21_7, Y_SC21_9, Y_BLK, Y_CLK, Y_SI1, Y_SI2

(3)Z Driving Control Signal Block

- Generate Control Signals to drive DATA COF (Z Driver IC). There are 8 Control Signals as follows.
- Z1_CLK1, Z1_CLK2, Z2_CLK1, Z2_CLK2, Z1_BLK, Z1_STB, Z2_BLK, Z2_STB

(4)Sub Control Signal Block

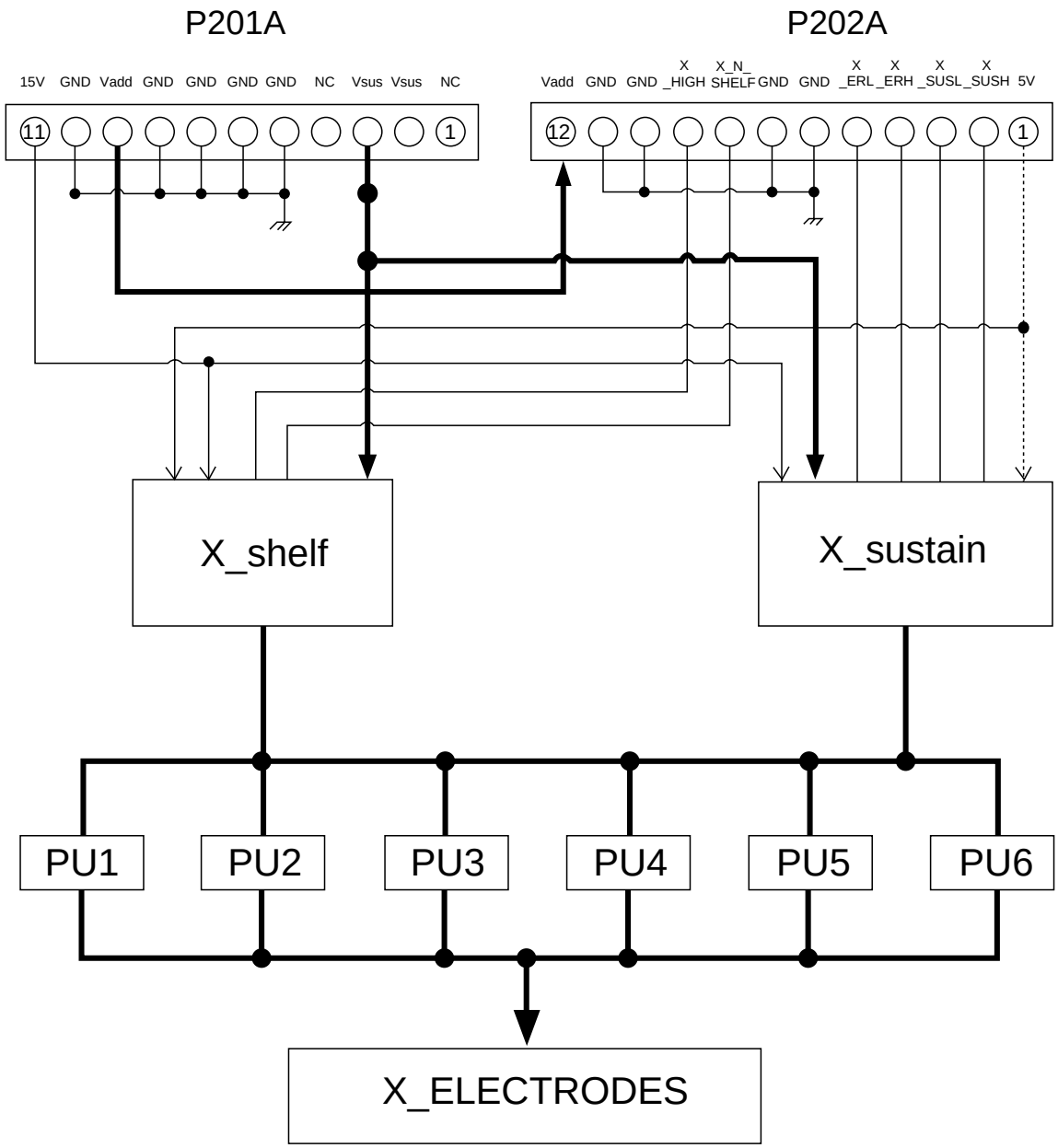
- Generate some Control Signals to control "Data Interface Block" and "SDRAM Control Block". There are 5 Control Signals as follows.
- F_SUBF, CLK_480, OUT_CLK, F_32SFT, SLCT

(5)APL Detection Block

- Detect the amount of input Data, which is so-called APL (Average Picture Level), and give APL to Timing Controller Block in order to control Power Consumption of PDP Set.

4-2-4. X-SUS PCB

1) X_SUSTAIN PCB block diagram



2) Structure of X_SUSTAIN PCB

- X_SUSTAIN BLOCK ➞ SUS_H / SUS_L / ER_H / ER_L(Energy Recovery Circuit) ➞HIC Structured
- Vshelf Generating Circuit ➞ From Vsus(173V) to X_HIGHT(163V) voltage generating circuit ➞ 15V to X_ N_SHELF(5V) voltage generating circuit ➞ Control Voltage by Variable Resistor RU1
- LOGIC Circuit that processes various waveform timing signal

3) Power Supply

Vsus - Supplied by POWER MODULE. Supplies X-SUS as well as generates X-HIGHT voltage.(173V)

15V - Supplied by POWER MODULE. Supplies FET driving power as well as generates X_N_SHELF voltage(5V).

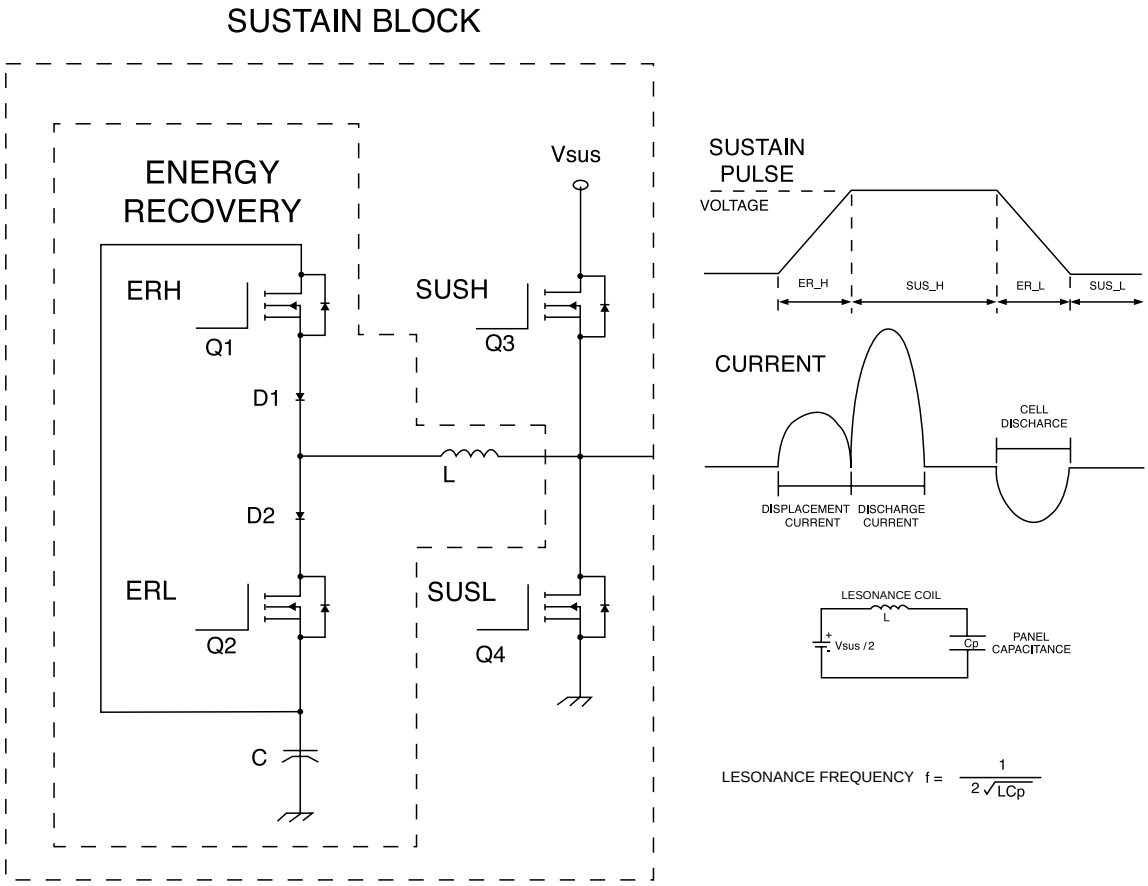
5V - Supplied through CONNECTION-board from DIGITAL-board. Used for LOGIC IC Power.

4) Signal

X_SUSTAIN ➞ SUS_H / SUS_L / ER_H / ER_L (Supplied from P202A)

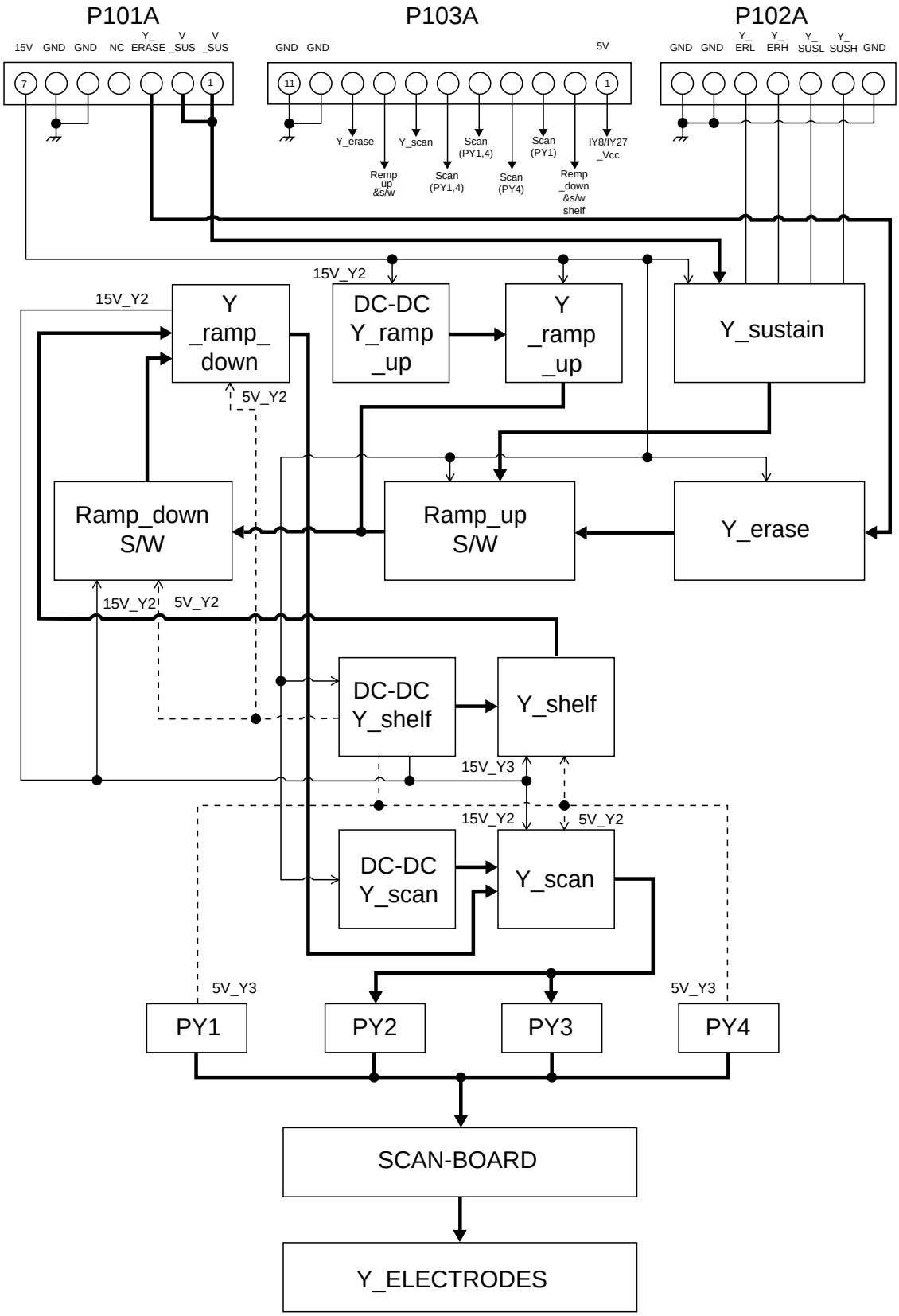
X_SHELF ➞ X_N_SHELF / X_HIGHT (Supplied from P202A)

5) SUSTAIN BLOCK



4-2-5. Y-SUS & SCAN PCB

1) Y_SUSTAIN PCB block diagram



2) Y_SUSTAIN PCB Structure

- SUSTAIN BLOCK → SUS_H / SUS_L / ER_H / ER_L (Energy Recovery Circuit)
- Structured with HIC
- RAMP_UP , RAMP_DOWN waveform generating circuit
- RAMP_UP_S/W , RAMP_DOWN_S/W
- Y_SCAN → -62V(based on GND) Applying Circuit
- Y_SHELF → 70V(based on GND) Applying Circuit
- Yer → 166V Applying Circuit
- RAMP_UP / Y_SCAN_VH / DC-DC converter circuit that generating Y_SCAN_GND's voltage
- LOGIC Circuit that processes various waveform timing signal

3) Power Supply

Vsus - Supplied from POWER MODULE.(173V)

15V - Supplied from POWER MODULE and used for FET's driving power and input powers of 3 DC-DC converter. Also, generates output voltage of each Y-RAMP_UP / Y-SCAN / Y_SHELF(Y_SCAN_GND).

5V - Supplied from POWER MODULE through DIGITAL-board. Used for LOGIC IC power supply. Also, power supply of 5V_Y2, 5V_Y3 is supplied through 7805 regulator from DC-DC converter Trans TY2's output.

Yer - Supplied by POWER MODULE. (166V)

GND - Power supply GND / Y1 / Y2 / Y3

4) Signal

Y_SUSTAIN → SUS_H / SUS_L / ER_H / ER_L(supplied by P102A)

Y_ERASE (supplied by P103A)

Y_SCAN (supplied by P103A)

Y_RAMP_DOWN & S/W (supplied by P103A)

Y_RAMP_UP & S/W (supplied by P103A)

SCAN → CLK / SI1 / SI2 / BLK (supplied by P103A)

4-2-6. CONNECTION PCB & DATA COF

1) Structure of CONNECTION PCB

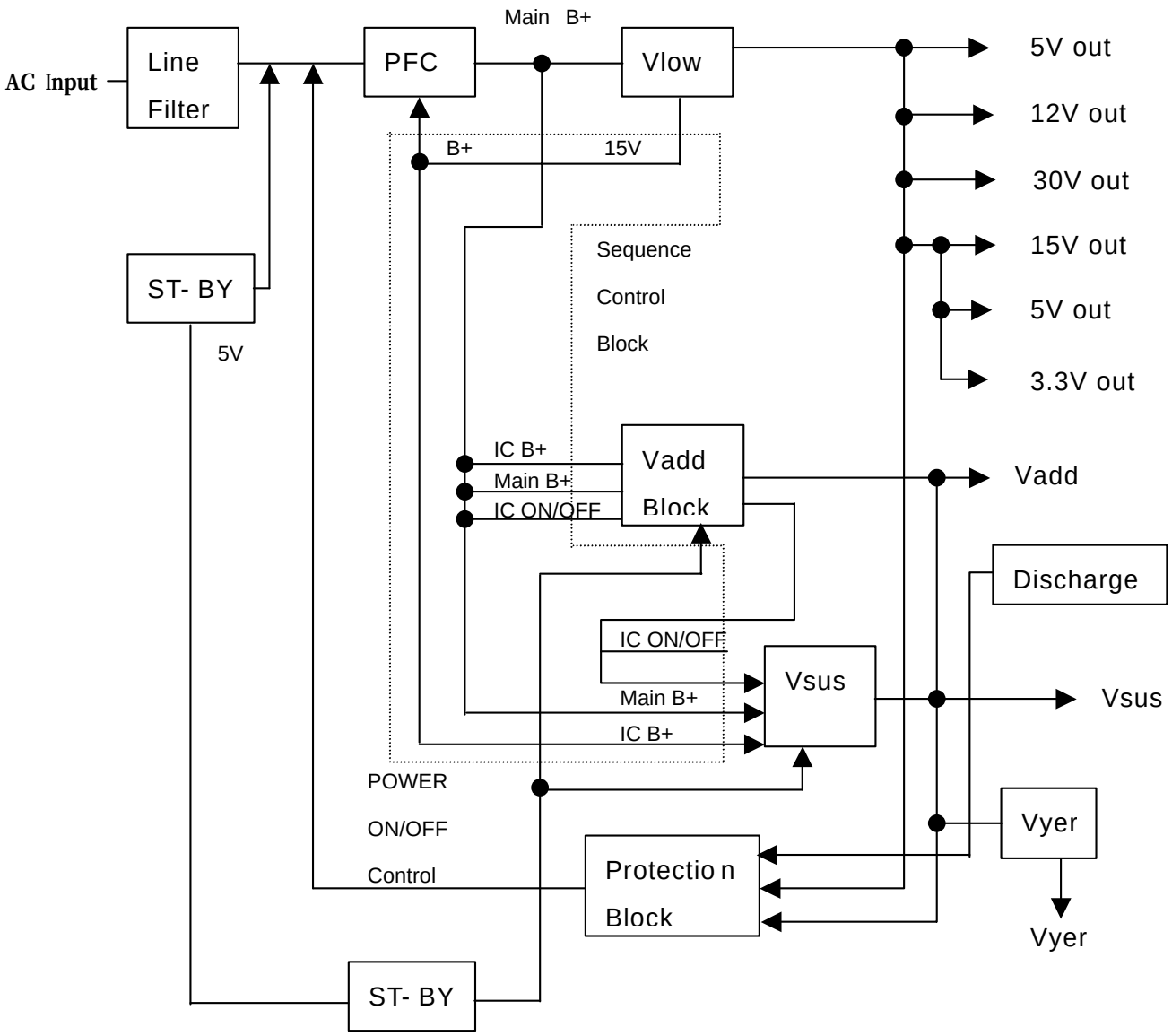
- Divided into 2 PCBs (CONN-LEFT & CONN-RIGHT)
- CONN-LEFT → From DIGITAL PCB through connector P304, data signal and 5V IC Power are supplied. Vadd Power is supplied to PC 5~7 through PC08A.
- CONN-RIGHT → From DIGITAL PCB through connector P304A, data signal and 5V IC Power are supplied. 5V Power is supplied to X-board through P202. Also, Data signals are supplied from DIGITAL PCB through P302A and X-sustain/X-shelf signals are supplied from X-SUS PCB through P202. Vadd Power is supplied to PC 1~4 from X-SUS PCB through P202 and to CONN-LEFT through PC8A1 and PC08A.

2) Structure of DATA COF

- 7 COF Type module(PC 1~7)
- DATA signals are transferred to CONNECTION PCB from DIGITAL PCB through P304A / P303A / P302A. And through PC 1~7 each are transferred to DATA COF.
- 5V supplied from DIGITAL PCB through connector P304A / P303A. Vadd flows POWER PCB → X-SUS PCB → connector P202 → CONNECTION PCB → DATA COF.

4-3. POWER BLOCK

4-3-1. POWER BLOCK DIAGRAM



If Power is "ON", V_PFC and V_LOW BLOCK is working and Voltage generated in V_LOW's 2nd Coil actuates V_ADD. After V_ADD is "ON", 2nd Voltage generated in V_ADD BLOCK acutates V_SUS BLOCK again.

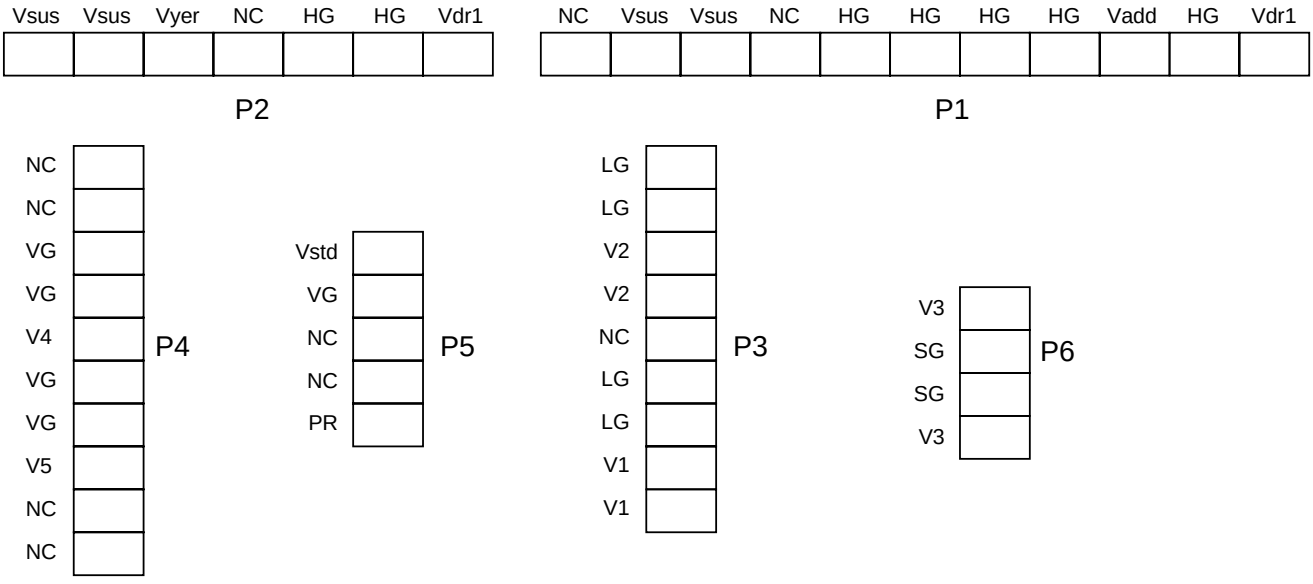
4-3-2. POWER PCB

◆ Rating : AC100~240 V, Single-Phase
Regulation Method : Transistor & Switching Method
◆ Rating Input Frequency : 50~60Hz, Inrush Current : under 35A.
◆ Output Voltage is as follows.

		Voltage(Vdc)							Current(Adc)		
		Rating (V)	Variable Range (V)	Tolerance (V)	Allowable overshoot Voltage(V)	OVP (V)	Ripple Voltage (mVp-p)	Ripple Noise Voltage (mVp-p)	Rating (A)	When Lode change	OCP (A)
1	Vsus	175	±10		200	200	2000	500	1.5	0.1~1.5	Over 3.2
2	Vadd	70	±10		90	100	500	300	1	0.1~1	Over 2.0
3	Vyer	160	±10		180		500	500	0.1	0~0.15	
4	Vdr1	15.5		±0.75	18	18	50	100	1	0.1~1	1.4
5	V1	5		±0.25	6		50	100	1	0.1~1	
6	V2	12		±0.6	13.6		50	100	0.6	0~1	
7	V3	17		±0.75	18		50	100	0.7	0~1	
		-17		±0.75	-18		50	100	0.7	0.1~1	
8	V4	5.1		±0.55	6.5		50	100	1	0.1~1	
9	V5	3.6		±0.33	3.66		33	66	1	0~1	
10	Vstb	5		±0.5	6		50	100	0.5	0~1	

* When "Protect Circuit" operates, all Outputs except Vstb are suspended. But, when Vstb is abnormal, all Outputs are suspended.
* OVP(Over Voltage Protection), OCP(Over Current Protection)

◆ The above table's Output Voltage output from the following connector.
(based on the Parts Side's silk name of POWER PCB)



* P2 is connected to Y-SUS PCB's P101A
  P1 is connected to X-SUS PCB's P201A
  P4 is connected to VIDEO PCB's PA4
  P5 is connected to VIDEO PCB's PA5
  P3 is connected to DIGITAL PCB's P301A
  P6 is connected to JACK PCB's PA6.

5. SERVICE MODE

5-1. Entering SERVICE MODE

Push Remote controller's "UP" → "MUTE" → "DISPLAY" → "MUTE" → BUTTON to enter SERVICE adjust MODE.

5-2. Default Values fot SERVICE MODE

1) PW171
   -SUB-BRIGHTNESS : 28
   -SUB-CONTRAST : 40
   -R-BIAS : 68
   -G-BIAS : 65
   -B-BIAS : 70
   -R-GAIN : 67
   -G-GAIN : 45
   -B-GAIN : 78

2) SAA7118
   -SUB BRT : 128
   -SUB CONT : 50
   -SUB CLR : 64
   -SUB TNT : 0
   -SUB SRP : 10

3) DPTV
   -SUB BRT : 59
   -SUB CONT : 13

4) CXA3516
   -SUB CONT : 58
   -Cb OFFSET : 39
   -Cr OFFSET : 37
   -HYS : 3
   -THRSLD : 14

5) MSP34X0

-PRESCALE : 22

5-3. Description of SERVICE MODE Items

1) PW171

(Note) This article is for adjustment after replacement of VIDEO PCB. These Values may vary from set to set. Therefore if these values are recorded before replacing VIDEO PCB, you do not need to adjust WHITE BALANCE additionally. The set up can be done using the recorded values.

(1)SUB BRT : Set up BRIGHT standard value of PW171.

(2) SUB CONT : Set up CONTRST standard value of PW171.

(3) BIAS R : Set up RED BIAS value during WHITE BALANCE

(4) BIAS G : Set up GREEN BIAS value during WHITE BALANCE

(5) BIAS B : Set up BLUE BIAS value during WHITE BALANCE

(6) GAIN R :Set up RED GAIN value during WHITE BALANCE

(7) GAIN G : Set up GREEN GAIN value during WHITE BALANCE

(8) GAIN B : Set up BLUE GAIN value during WHITE BALANCE

2) SAA7118

(Note) This article is not for adjustment after replacement of VIDEO PCB. Therefore do not change initial values.

(1) SUB BRT : Set up BRIGHT standard value of SAA7118.

(2) SUB CONT : Set up CONTRAST standard value of SAA7118.

(3) SUB CLR : Set up COLOR standard value of SAA7118.

(4) SUB TNT : Set up TINT standard value of SAA7118.

(5) SUB SRP : Set up SHARPNESS standard value of SAA7118.

3) DPTV

(Note) This article is not for adjustment after replacement of VIDEO PCB. Therefore do not change initial values.

(1) SUB BRT : Set up BRIGHT standard value of DPTV MVS.

(2) SUB CONT : Set up CONTRAST standard value of DPTV MVS.

4) CXA3516

(Note) This article is not for adjustment after replacement of VIDEO PCB. Therefore do not change initial values.

(1) SUB CONT : Set up CONTRAST standard value of CXA 3516

(2) Cb OFFSET : Set up BLACK LEVEL of Cb CHANNEL

(3) Cr OFFSET : Set up BLACK LEVEL of Cr CHANNEL

(4) HYS : Set up HYSTERISIS of SYNC

(5) THR SLP : Set up THRESHOLE of PEDESTAL LEVEL

5) MSP34X0

(Note) This article is not for adjustment after replacement of VIDEO PCB. Therefore do not change initial values.

(1) PRESCLE : Set up AUDIO output signal' s magnitude

6) MISC

(1) TST PTRN AT : Changing TEST PATTERN (RED→GREEN→BLUE→BLACK→WHITE) every minute automatically.

(2) TST PTRN MA : Changing RED→GREEN→BLUE→BLACK→WHITE TEST PATTERN manually using VOLUME UP KEY.

(3) AT PWR : ON - Condition where turning AC power on, automatically turns the SET on.
OFF -Condition where turning AC power on makes the Set STAND BY, and Remocon' s POWER on turns the set on from STAND BY state.

(4) JACK : Set up depending on JACK BOARD' s input MODE

- MULTI : Used by DSP-4280 series
- MONITOR : Used by DSP-4282 series
- MONITOR+ : Used by DSP-4282 series with DSP-JU20 attached.

(Note) Wront setup causes displaying problem. So you must be careful when SETTING.

(5) PXL SFT

ON - Moving screen up, down left and right by some PIXELs every 20 seconds.

OFF - Fixing PIXEL position. No movement on screen.

(Note) PIXEL SHIFT function is solution to PDP's characteristic phenomenon, so-called "Image Sticking" problem. Leave this function ON, When displaying many fixed screen like PC screen. When this function is ON the screen will move a little for every fixed interval but a human eye can not recognize it well.

7) INFOR

(1) VER : Displaying Software’s VERSION

8) RESET

(1) EDID

(2) LEVEL 1 : RESET SERVICE MODE Condition’s All Values.

(3) LEVEL 2 : RESET SERVICE MODE Condition’s All Values except PW171 values

(4) FACTORY : RESET to factory shipping initialiaztion.

6.Adjusting Method

6-1. Adjusting WHITE BALANCE

(1) Input 5 STEP GRAY SCALE PATTERN to Video Input Terminal. (refer to FIG<26>)

(2) Set the SCREEN MODE to "NORMAL".

(3) Enter SERVICE MODE by inputting remote controller's "UP" → "MUTE" → "DISPLAY" => "MUTE" BUTTON, and then select PW171 and check Default Values of SERVICE MODE Items. (refer to article 5. Service Mode)

(4) Attach WHITE BALANCE METER(FACTORY USE METER: CA-100) SENSOR to 80% Gray Scale part. (refer to FIG<26>)

(5) Adjust WHITE BALANCE by varying R,G,B GAIN
-. Control R,G,B GAIN values so that the ranges are within "Default Value" ±10.
If deviate from the range, classify the SET disqualified.
-. Set color coordinate to x = 0.280 ±0.01, y = 0.290 ±0.01 and color temperature to above or equal to 10,000°K.

(6) Attach WHITE BALANCE METER's SENSOR to 40% Gray Scale part. (refer to FIG<26>)

(7) Adjust WHITE BALANCE by varying R,G,B BIAS
-. Control R,G,B BIAS values so that the ranges are within "Default Value" ±5.
If deviate from the range, classify the SET disqualified.
-. Set color coordinate to x = 0.280 ±0.01, y = 0.290 ±0.01.

(8) Repeat above (4) ~ (7) until color coordinate is x=0.280, y=0.290. Attach WHITE BALANCE METER's SENSOR to 100% Gray Scale part. (refer to FIG<26>) Control SUB CONTRAST so that LUMINANCE is above or equal to 140 Cd/m2.

(9) Enter MENU BUTTON and Exit SERVICE MODE.

6-2. Adjusting Driving Voltage and Waveform

6-2-1. Adjusting POWER PCB

(Note.1) Factory adjusted optimum voltage is stated at the LABEL located above the VIDEO PCB. (refer to FIG<1>)
(Note.2) After replacing POWER PCB, adjust each voltage to optimum control voltage stated at the LABEL.
(Note.3) Screen Condition : Enter SERVICE MODE and run TEST PATTERN FULL WHITE (refer to 5. Service Mode)
(Note.4) Contact MULTIMETER's (-) TIP on the CHASSIS GROUND and (+) TIP on the adjusting TP. (refer to FIG<22>)
(Note.5) Because adjusting while the SET is in operation, be cautious not to touch other parts than adjusting TP with MULTIMETER's TIP. Make sure to use Plastic adjusting tool to adjust VOLUME. (refer to FIG<22>)

1) Vsus(SUSTAIN Voltage) : Discharge Sustain Voltage
METER used : DIGITAL MULTIMETER (DC Voltage Measure Mode)
Adjusting TP : TP1 (refer to FIG<20>)
Adjusting VOLUME : RV500 (refer to FIG<20>)
Standard Voltage : 173V (This value could be different from the optimum adjusting voltage)
Optimum adjusting Voltage : Stated in the LABEL (refer to FIG<1>)

2) Vyer(ERASE voltage) : Erase operation initial voltage of Last Sustain Pulse
METER used : DIGITAL MULTIMETER (DC Voltage Measure Mode)
Adjusting TP : TP3 (refer to FIG<20>)
Adjusting VOLUME : RV501 (refer to FIG<20>)
Standard Voltage : 166V (This value could be different from the optimum adjusting voltage)
Optimum adjusting Voltage : Stated in the LABEL (refer to FIG<1>)

3) V_{ADD}(ADDRESS voltage) : DATA Input Voltage
METER used : DIGITAL MULTIMETER (DC Voltage Measure Mode)
Adjusting TP : TP2 (refer to FIG <20>)
Adjusting VOLUME : RV300 (refer to FIG <20>)
Standard Voltage : 72V (This value could be different from the optimum adjusting voltage)
Optimum adjusting Voltage : Stated in the LABEL (refer to FIG<1>)

6-2-2. Adjusting X-SUS PCB

(Note.1) Factory adjusted optimum voltage is stated in the LABEL above the VIDEO PCB. (refer to FIG<1>)
(Note.2) After replacing X-SUS PCB, adjust each voltage to the optimum adjusting voltage as stated in the LABEL
(Note.3) Screen Condition : After entering SERVICE MODE, run TEST PATTERN FULL WHITE (refer to 5. Service Mode)
(Note.4) Contact MULTIMETER's (-) TIP on the CHASSIS GROUND and (+) TIP on the adjusting TP. (refer to FIG<22>)
(Note.5) Because adjusting while the SET is in operation, be cautious not to touch other parts than adjusting TP with MULTIMETER's TIP. Make sure to use Plastic adjusting tool to adjust VOLUME. (refer to FIG<22>)

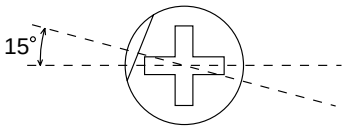
1) Vx_shelf (x_shelf Voltage) : X electrode sustaining voltage when writing DATA
METER used : DIGITAL MULTIMETER (DC Voltage Measure Mode)
Adjusting TP : DCU16 (+) electrode (refer to FIG<6-1>, FIG<3>, and the following Figure)
Adjusting VOLUME : RU1 (refer to FIG<6-1>, and FIG<3>)
Standard Voltage : 158V (This value could be different from the optimum adjusting voltage)
Optimum adjusting Voltage : Stated in the LABEL (refer to FIG <1>)

DCU16

6-2-3. Adjusting Y-SUS PCB

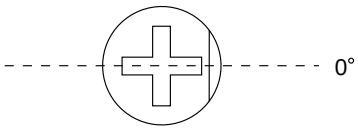
(Note.1) Factory adjusted optimum voltage is stated in the LABEL located above the VIDEO PCB. (refer to FIG<1>)
(Note.2) After replacing Y-SUS PCB, adjust each voltage to the optimum adjust voltage as stated in the LABEL
(Note.3) Screen Condition : After entering SERVICE MODE, run TEST PATTERN FULL WHITE (refer to 5. Service Mode)
(Note.4) Contact MULTIMETER's (-) TIP on the CHASSIS GROUND and (+) TIP on the adjusting TP. (refer to FIG<22>)
(Note.5) Because adjusting while the SET is in operation, be cautious not to touch other parts than adjusting TP with MULTIMETER's TIP. Make sure to use Plastic adjusting tool to adjust VOLUME. (refer to FIG<22>)

1) Ramp Up Slope Adjustment
Adjusting VOLUME : RY2 (refer to FIG<6-2>, and FIG<2>)
Adjusting Method : Adjust VOLUME direction as shown below.



RY2

2) Ramp Down Slope Adjustment
Adjusting VOLUME : RY10 (refer to FIG<6-2>, and FIG<2>)
Adjusting Method : Adjust VOLUME direction as shown below.

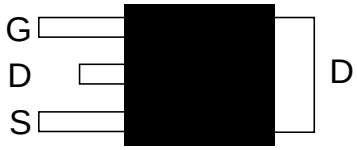


RY10

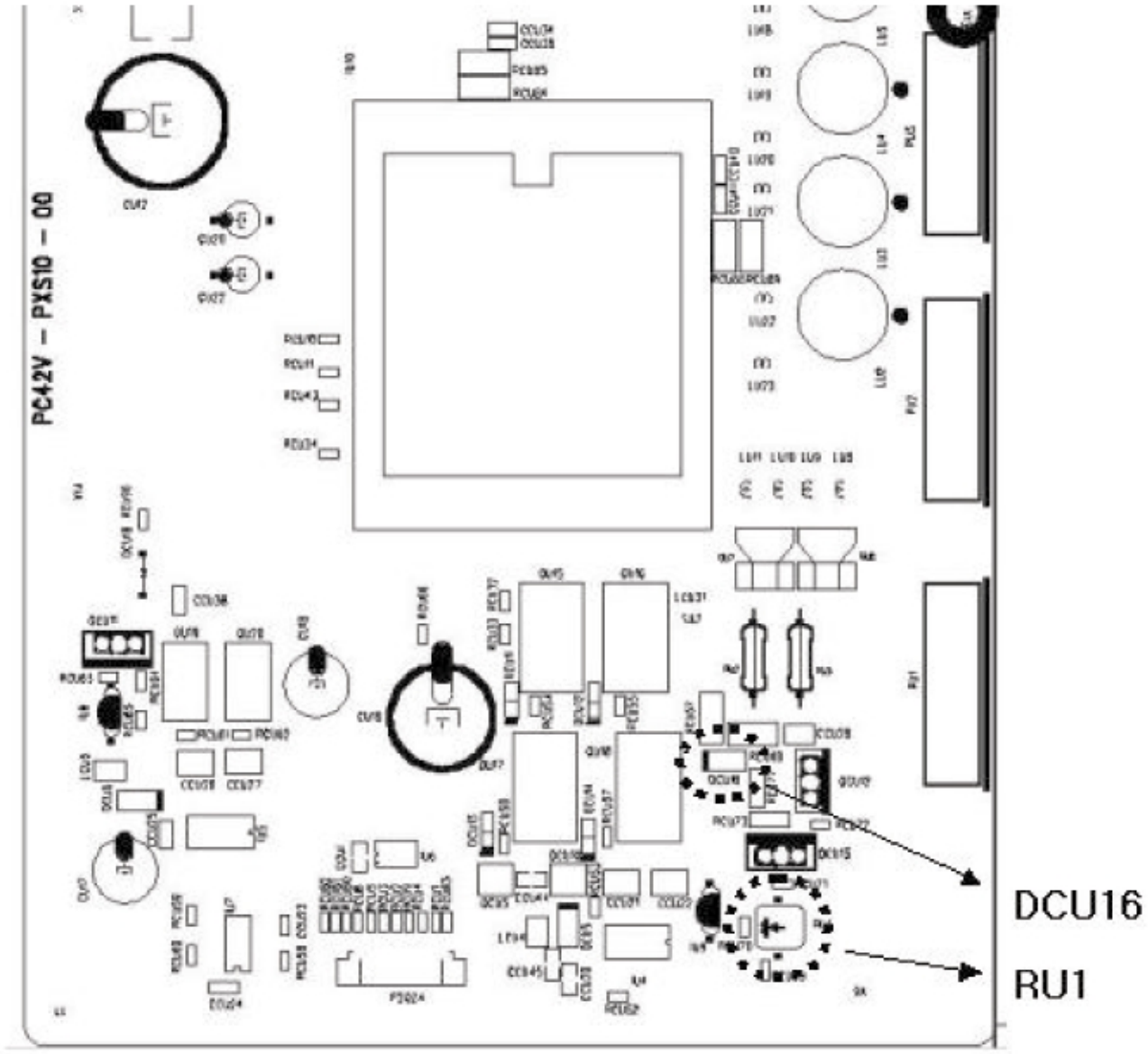
3) Vramp_up (Ramp Up voltage) : Ramp Up voltage of Reset Waveform
METER used : DIGITAL MULTIMETER (DC Voltage Measure Mode)
Adjusting TP : DCY53's (+) electrode (refer to FIG<6-2>, FIG<2> , and the following Figure)
Adjusting VOLUME : RY7 (refer to FIG<6-2> and FIG<2>)
Standard Voltage : 230V (This value could be different from the optimum adjusting voltage)
Optimum adjusting Voltage : Stated in the LABEL (refer to FIG<1>)

DCY53

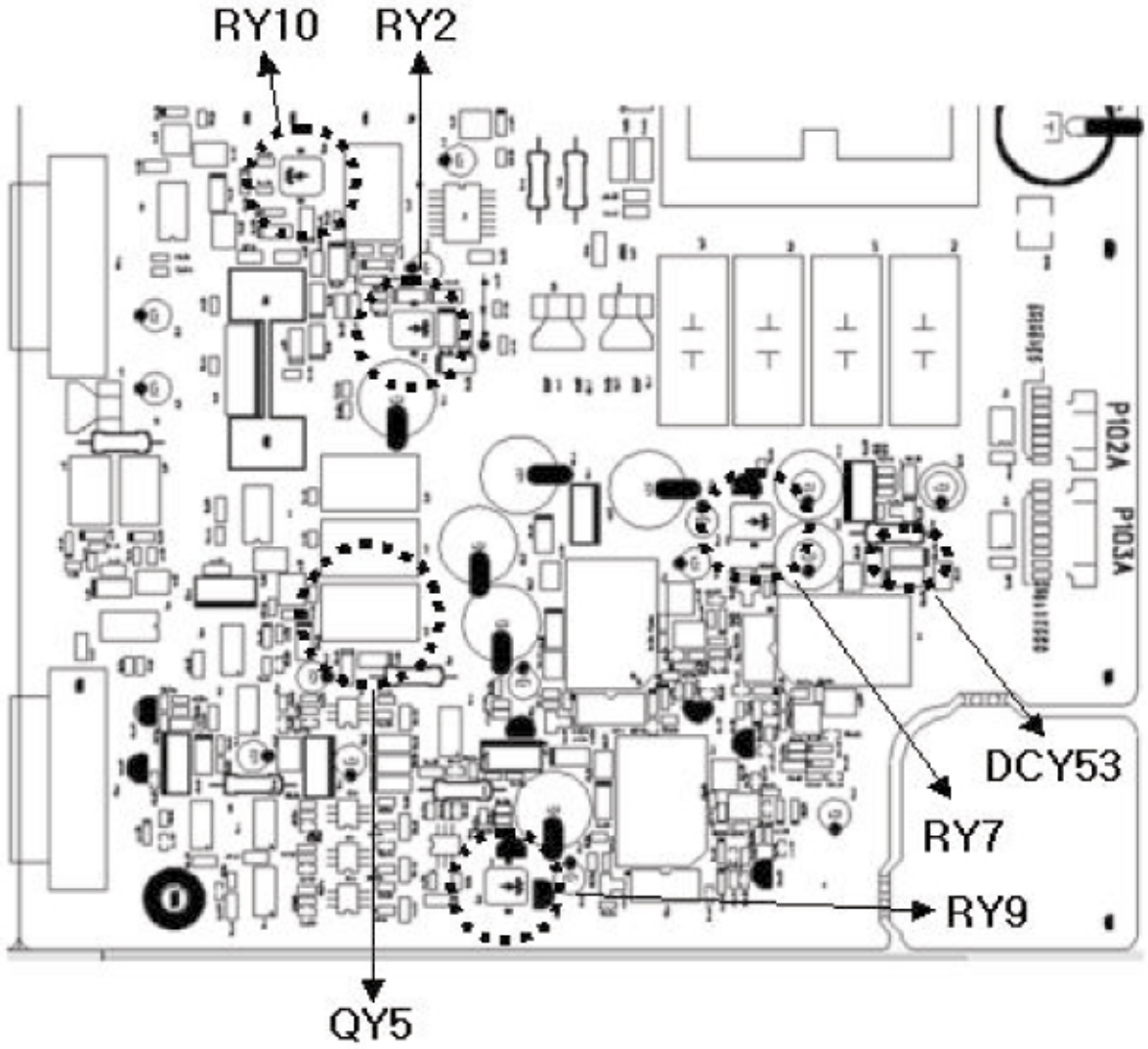
4) Vscan (SCAN voltage) : SCAN IC's GND voltage when SCAN
METER used : DIGITAL MULTIMETER (DC Voltage Measure Mode)
Adjusting TP : QY5 S(Source) electrode (refer to FIG<6-2>, FIG<2> , and the following Figure)
Adjusting VOLUME : RY9 (refer to FIG<6-2> and FIG<2>)
Standard Voltage : -62V (This value could be different from the optimum adjusting voltage)
Optimum adjusting Voltage : Stated in the LABEL (refer to FIG<1>)



QY5



FIG<6-1>X-SUS PCB Adjusting Points

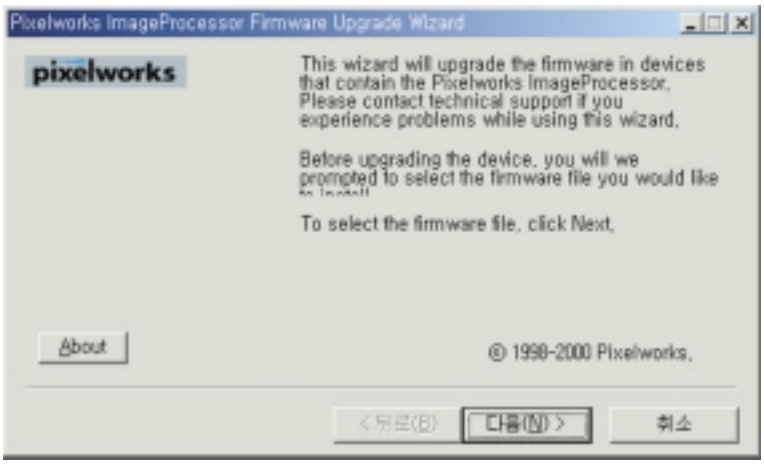


FIG<6-2>Y-SUS PCB Adjusting Points

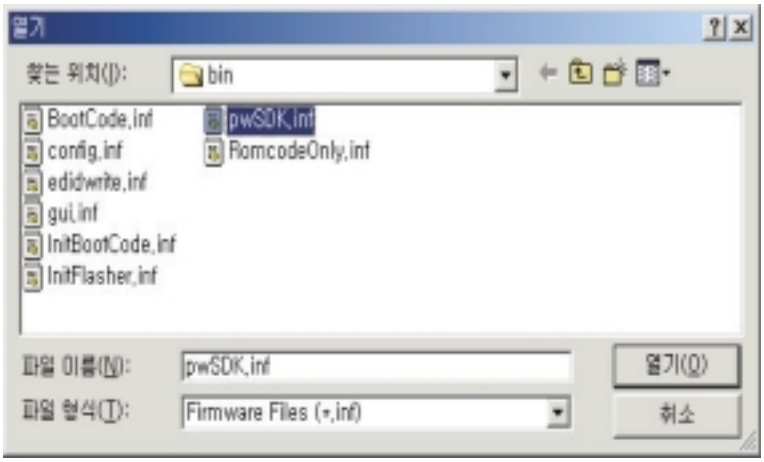
7. SOFTWARE UPGRADE Method

7. SOFTWARE UPGRADE Method

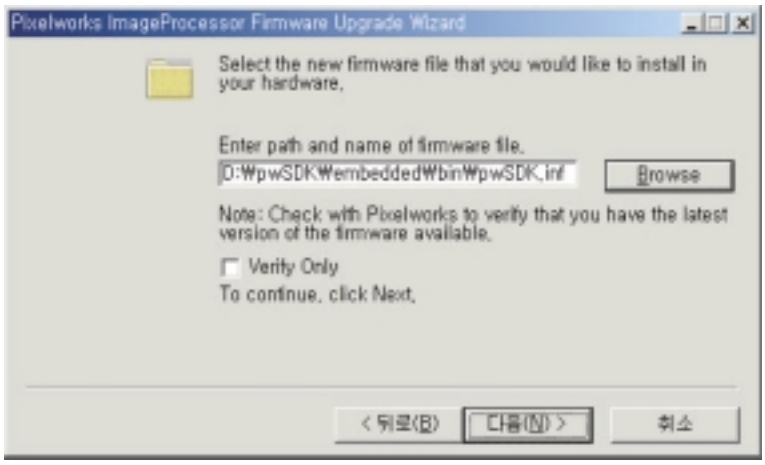
1. Connect the JACK PCB to the Video PCB.
2. Connect 9 PIN serial cable to the computer's serial port.
3. Connect serial cable's opposite end to Jack PCB's RS-232C port.
4. Run PC's Flashupgrader.exe and then push "Next(N) >" button.


Pixelworks ImageProcessor Firmware Upgrade Wizard
pixelworks
This wizard will upgrade the firmware in devices that contain the Pixelworks ImageProcessor. Please contact technical support if you experience problems while using this wizard.
Before upgrading the device, you will we prompted to select the firmware file you would like
To select the firmware file, click Next.
About
© 1998-2000 Pixelworks,
다음(N) >
취소

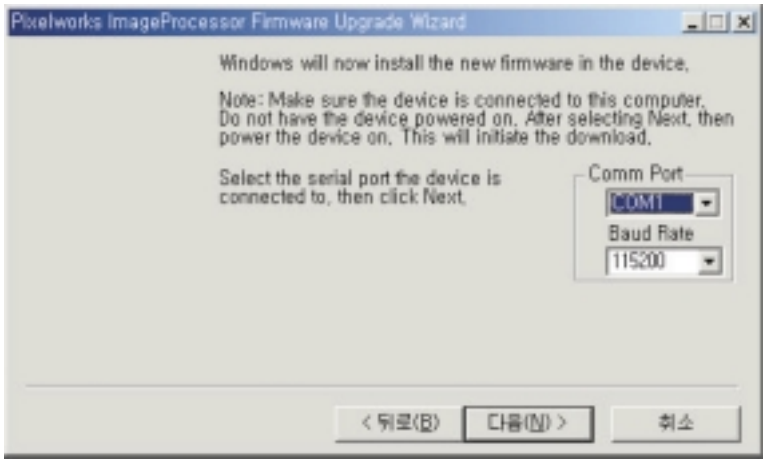
5. Select current Upgrade file
   - Copy files sent by research center to a folder you wish to copy.
   - Browse and Select pwSDK.inf from the folder.



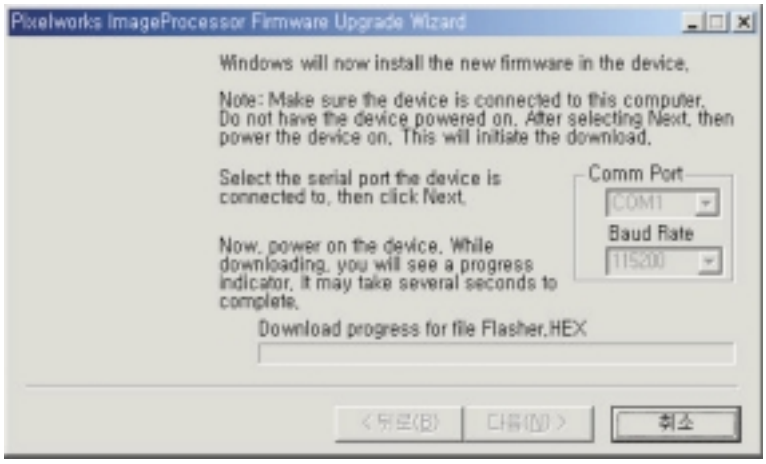
   - Push "Next(N) >" button.

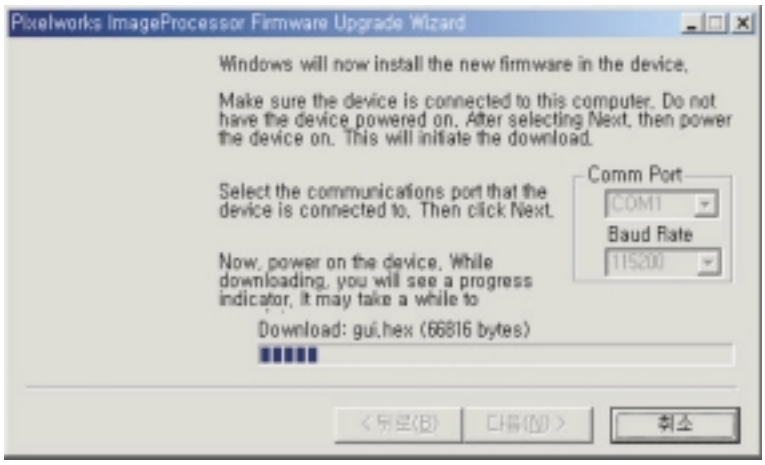

Pixelworks ImageProcessor Firmware Upgrade Wizard
Select the new firmware file that you would like to install in your hardware.
Enter path and name of firmware file.
D:WpwSDKWembeddedWbinWpwSDK.inf
Browse
Note: Check with Pixelworks to verify that you have the latest version of the firmware available.
Verify Only
To continue, click Next.
< 뒤로(B)
다음(N) >
취소

6. Select as above and push "Next(N) >" button. Select Comm port and Boud rate and push "Next(N) >" button.

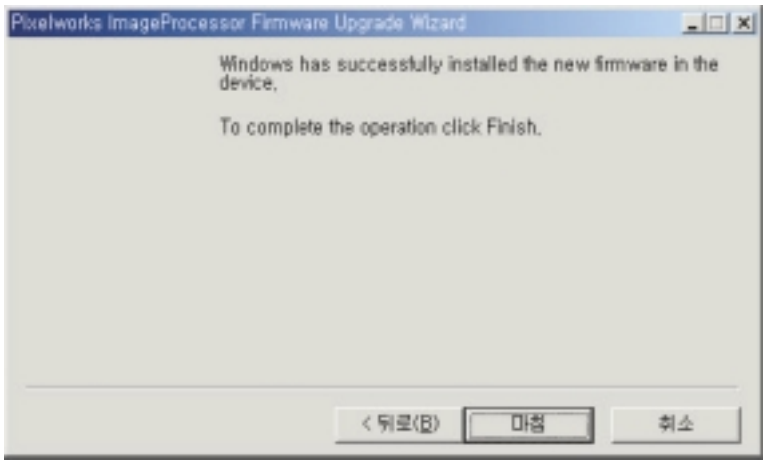

Pixelworks ImageProcessor Firmware Upgrade Wizard
Windows will now install the new firmware in the device.
Note: Make sure the device is connected to this computer. Do not have the device powered on. After selecting Next, then power the device on. This will initiate the download.
Select the serial port the device is connected to, then click Next.
Comm Port
COM1
Baud Rate
115200
< 뒤로(B)
다음(N) >
취소

7. Upgrade process will be displayed. Power the AC on will initiate the download.


Pixelworks ImageProcessor Firmware Upgrade Wizard
Windows will now install the new firmware in the device.
Note: Make sure the device is connected to this computer. Do not have the device powered on. After selecting Next, then power the device on. This will initiate the download.
Select the serial port the device is connected to, then click Next.
Comm Port
COM1
Baud Rate
115200
Now, power on the device. While downloading, you will see a progress indicator. It may take several seconds to complete.
Download progress for file Flasher.HEX
< 뒤로(B)
다음(N) >
취소


Pixelworks ImageProcessor Firmware Upgrade Wizard
Windows will now install the new firmware in the device.
Make sure the device is connected to this computer. Do not have the device powered on. After selecting Next, then power the device on. This will initiate the download.
Comm Port
Select the communications port that the device is connected to. Then click Next.
COM1
Baud Rate
115200
Now, power on the device. While downloading, you will see a progress indicator. It may take a while to
Download: gui.hex (66816 bytes)
< 뒤로(B)
다음(N) >
취소

8. When all files Upgrade are complete, a window(below) will open. Push "Finish" button to complete the process.


Pixelworks ImageProcessor Firmware Upgrade Wizard
Windows has successfully installed the new firmware in the device.
To complete the operation click Finish.
< 뒤로(B)
마침
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8. SET Disassemble/Assemble Method

8. SET Disassemble/Assemble Method.

8-1. Facts You Must Know When Disassembling/Assembling PDP SET

(1) BACK COVER can be opened without separating the STAND from the PDP SET. (i.e. BACK COVER can be opened without laying the SET)

(2) When PDP SET is opened with STAND attached, STAND connecting screws (without the BACK COVER) must be used to stabilize the set.

(3) When closing BACK COVER again after the work is finished, unscrew STAND connecting screws (without the BACK COVER) and then close the BACK COVER.

(4) All PCBs except CONN-LEFT, CONN-RIGHT PCB can be replaced with STAND attached.

(5) When replacing CONN-LEFT, CONN-RIGHT PCB, separate STAND from PDP SET first and then lay the SET on a safe place to work.

(6) When working with SET standing, be careful not to let screws or PCBs drop inside SET.

(7) Screws, connector cables, and other tools must be kept separately for reassemble.

8-2. PCB Disassemble/Assemble Method

(1)SCANH/L PCB (refer to FIG<14>, FIG<15>)

Unscrew screws ➞ After lightly lift the PCB from the screw boss, disconnect from CONNECTOR (PY01~PY04) connected to Y-SUS PCB. ➞ Turn the PCB over and disconnect from PANEL FPC CONNECTOR (PS01~PS08).

(2) Y-SUS PCB (refer to FIG<2>)

Disconnect SCANH/L PCB from Y-SUS PCB ➞ Disconnect CONNECTOR (P101A~P103A) ➞Unscrew screws.

(3)X-SUS PCB (refer to FIG<3>)

Disconnect CONNECTOR (P201A~P202A, PU1~PU6) ➞ Unscrew screws.

(4)POWER PCB (refer to FIG<5>)

Disconnect CONNECTOR (P1~6) ➞ Unscrew screws.

(5)JACK PCB (refer to FIG <5>) and FIG<19>)

Disconnect CONNECTOR (PA6) ➞ Unscrew 2 screws connecting VIDEO PCB's Shield Case ➞ Unscrew 3 screws in TERMINAL PLATE's external ➞ Disconnect JACK PCB from CONNECTOR (P502) connecting VIDEO PCB ➞ Disconnect INLET FILTER

(6)VIDEO PCB (refer to FIG<4>)

Disconnect Connecting Connector (PA4~PA5, P601~P603) ➞ Disconnect JACK PCB ➞ separate from four plastic support.

(7)DIGITAL PCB (refer to FIG<11>, FIG<12>)

Detach JACK PCB ➞ Detach VIDEO PCB ➞ Detach Connecting Connector (P102~P103,

P302~P304, PA603) ➞ Detach iron support ➞ Unscrew screws

(8)CONN-LEFT PCB (refer to FIG<6>, FIG<8>, FIG<11>)

Detach STAND from PDP SET ➞ Lay PDP SET in a stable place ➞ Detach JACK PCB ➞ Detach Stand holding iron structures (LEFT & RIGHT) ➞ Detach Connecting Connector (PC5~PC7, P304A, PC08A) ➞ Unscrew screws

(9)CONN-RIGHT PCB (refer to FIG<6>, FIG<8>, FIG<11>)

Detach STAND from PDP SET ➞ Lay PDP SET in a stable place ➞ Detach JACK PCB ➞ Detach Stand holding iron structures (LEFT & RIGHT) ➞ Detach Connecting Connector (PC1~PC4, P202, P302A~P303A, PC8A1) ➞ Unscrew screws

(10)KEY PCB (refer to FIG<8>)

Unscrew screws

(11)AC SWITCH & LED PCB (refer to FIG<10>, FIG<13>)

(Warning) Careful not to break Panel Gas Exhaust Tube!!!

Unscrew screws

(12)Assembling procedure is in the reversing sequence of the disassembling procedure.

8-3. FRONT MASK Disassemble/Assemble Method

8-3-1. Assembling/Disassembling with STAND attached.

(1)Detach BACK COVER (refer to FIG<19>)

(2)With BACK COVER detached, screw STAND holding screws. (Refer to FIG<6>)

(3)Unscrew the lower 2 screws of 3 screws located at the TERMINAL PLATE.

(Refer to FIG<19>)

(4)Detach KEY PCB

(5)Detach AC SWITCH & LED PCB

(6)Unscrew 4 FRONT MASK holding screws located at each corner of PANEL BACK PLATE

(Refer to FIG<7> ~ FIG<10>, FIG<13>)

(Note.1) At least two people must work together when assembling/disassembling FRONT MASK.

(Note.2) Unscrewing these 4 screws separate FRONT MASK and PANEL completely. Therefore, one person must be holding the FRONT MASK while unscrewing.

(7)Carefully separate FRONT MASK to the perpendicular direction from PANEL BACK PLATE.

Plastic guides located at the upper corners (left and right) of FRONT MASK is used for proper connection to PANEL BACK PLATE.

(Refer to FIG<7> ~ FIG<10>, FIG<13>)

(8)Assembling procedure is in the reversing sequence of disassembling procedure.

(Note) Be cautious of FILTER GLASS not being stained with dust or extraneous material. Clean FILTER GLASS with a clean and soft cloth before assembling.

8-3-2. Assembling/Disassembling procedures without STAND attached.

(1) Lay the Set on soft and safe place.

(2)Detach BACK COVER

(3)Unscrew the lower 2 screws of 3 screws located at the TERMINAL PLATE. (Refer to FIG<19>)

(4)Detach KEY PCB

(5)Detach AC SWITCH & LED PCB

(6)Unscrew 4 FRONT MASK holding screws located at each corner of PANEL BACK PLATE

(Note.1) At least two people must work together when assembling/disassembling FRONT MASK.

(Note.2) Unscrewing these 4 screws separate FRONT MASK and PANEL completely. Therefore, one person must be holding the FRONT MASK while unscrewing.

(7)Lift Iron handles attached to the each corners of PANEL BACK PLATE perpendicularly by two workers and put it where clean and safe.

8-4. FILTER GLASS Disassemble/Assemble Method (refer to FIG<18>)

(1)Separate FRONT MASK from the Set.

(2)Put the FRONT MASK down where safe for work.

(3)Unscrew 4 Iron structure's screws (LEFT, RIGHT, UP, DOWN) holding FILTER GLASS.

(Note) There are two kinds of screws so check the proper position.

(4)Carefully, separate FILTER GLASS from FRONT MASK

(5)Assembling procedure is in the reversing sequence of disassembling procedure.

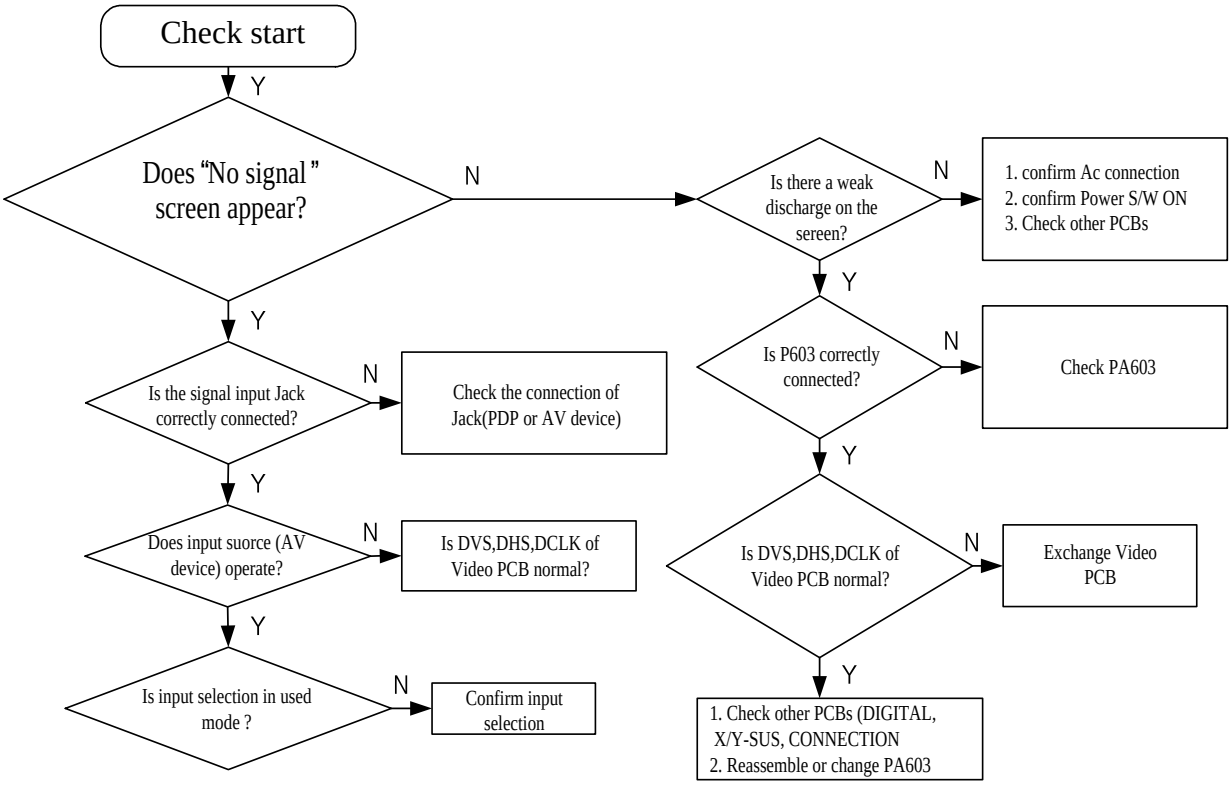
(Note.1) Check front and back of FILTER GLASS. Make sure front is facing FRONT MASK's external view.

(Note.2) Be cautious of FILTER GLASS not being stained with dust or extraneous material. Clean FILTER GLASS with a clean and soft cloth before assembling.

9. Main PCB Trouble Diagnosis

9-1. VIDEO & JACK PCB Trouble Diagnosis

1. Common checking process when “No signal” or “No raster”



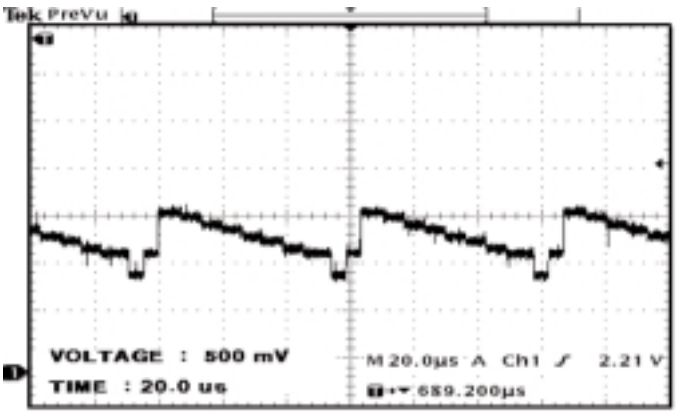
2. When No VIDEO (COMPOSITE , S-VHS , Y Cb Cr) signal on screen

(1)Input PC or DTV signal and see if PC or DTV signals shown on screen

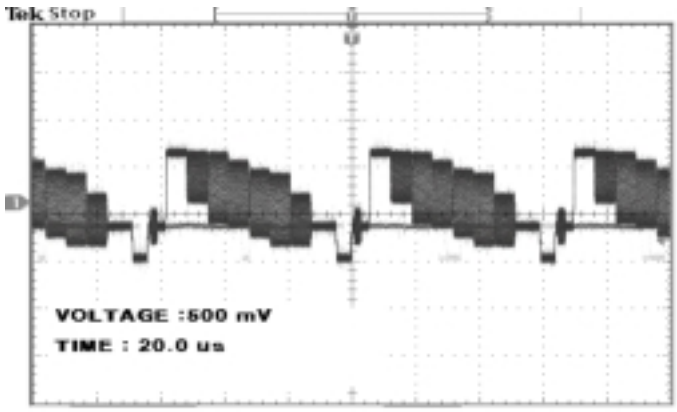
→ If no signal then check TP DCLKB. DHS. DVS signal

→ if DCLKB. DHS. DVS signal do not appear, VIDEO PCB has a trouble.

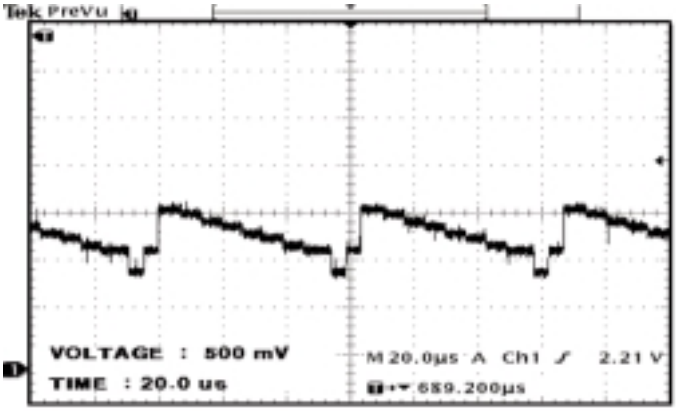
(2) When Y Cb Cr input : Check 16th pin of P502



COMPOSITE Input : TP Vin check



S- VHS input : Check 24th pin of P502(when COLOR BAR PATTERN)



➞ If above signal do not appear, JACK PCB has a trouble.

(3)TP DECOE Check

➞ If DECOE signal do not appear, JACK PCB has a trouble.

(CF : When COMPOSITE NTSC 3.58MHz, check TP COMB. CCOMB as well)

(4)TP VVS. VHS. VCLK. VPEN1 Check

➞ If VVS. VHS. VCLK. VPEN1 signal do not appear, JACK PCB has a trouble.

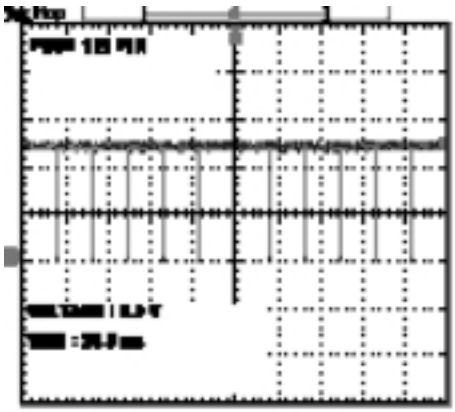
3. When DTV (1080i. 720P. 480P) signal do not appear on screen

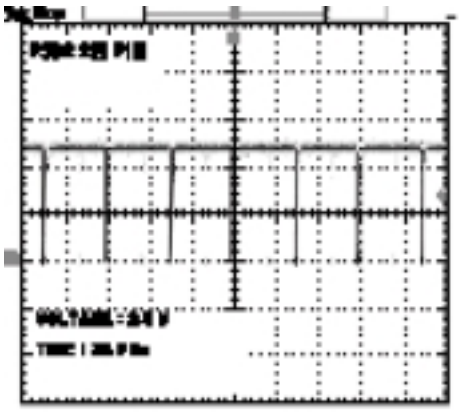
(1)Input PC or VIDEO signal and see if PC or VIDEO signals shown on screen

➞ If no signal then check TP DCLKB. DHS. DVS

➞ If DCLKB. DHS. DVS signal do not appear, VIDEO PCB has a trouble.

(2) Check P502's 1st PIN(V SYNC) , 2nd PIN(H SYNC) check-<when 1080i >





→ If above signal do not appear, JACK PCB has a trouble.

(3) TP GHS . GVS . GCLK check

→ If GHS . GVS . GCLK signal do not appear, JACK PCB has a trouble.

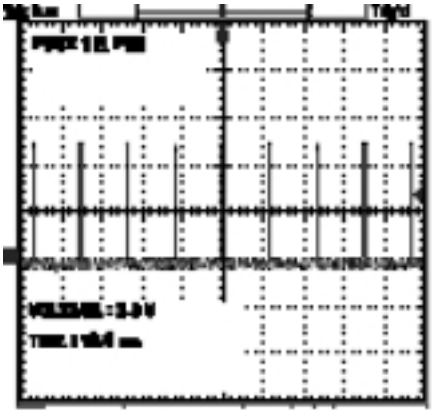
4. When PC signal do not appear on screen

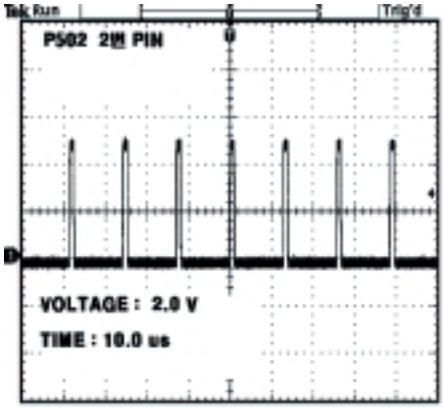
(1)Input DTV or VIDEO signal and see if DTV or VIDEO signals shown on screen

→ If no signal then check TP DCLKB. DHS. DVS

→ If DCLKB. DHS. DVS signal do not appear, JACK PCB has a trouble.

(2) P502's 1st PIN(V SYNC) , 2nd PIN check(H SYNC)(when 800 X 600)



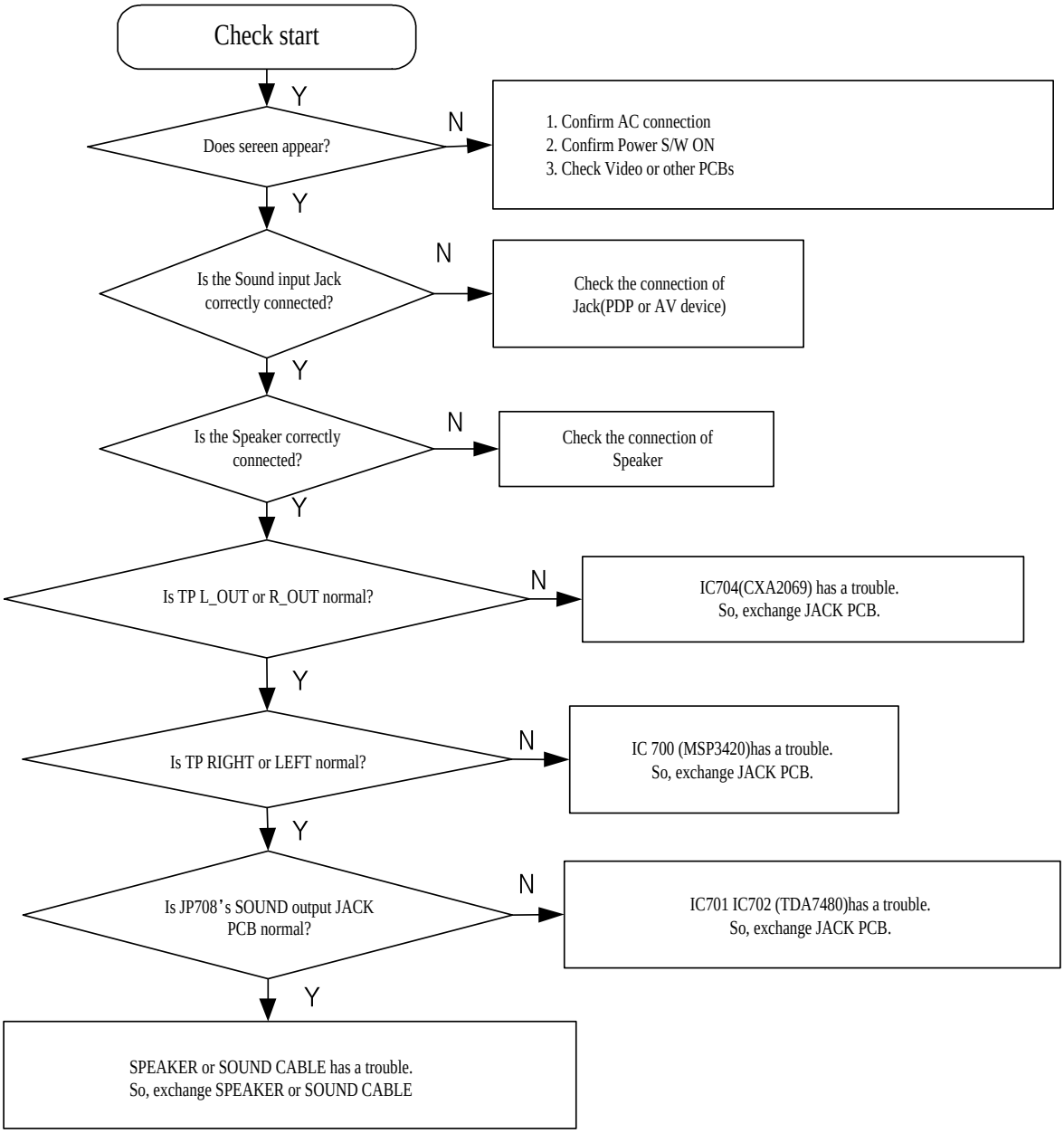


→ If above signal do not appear, JACK PCB has a trouble.

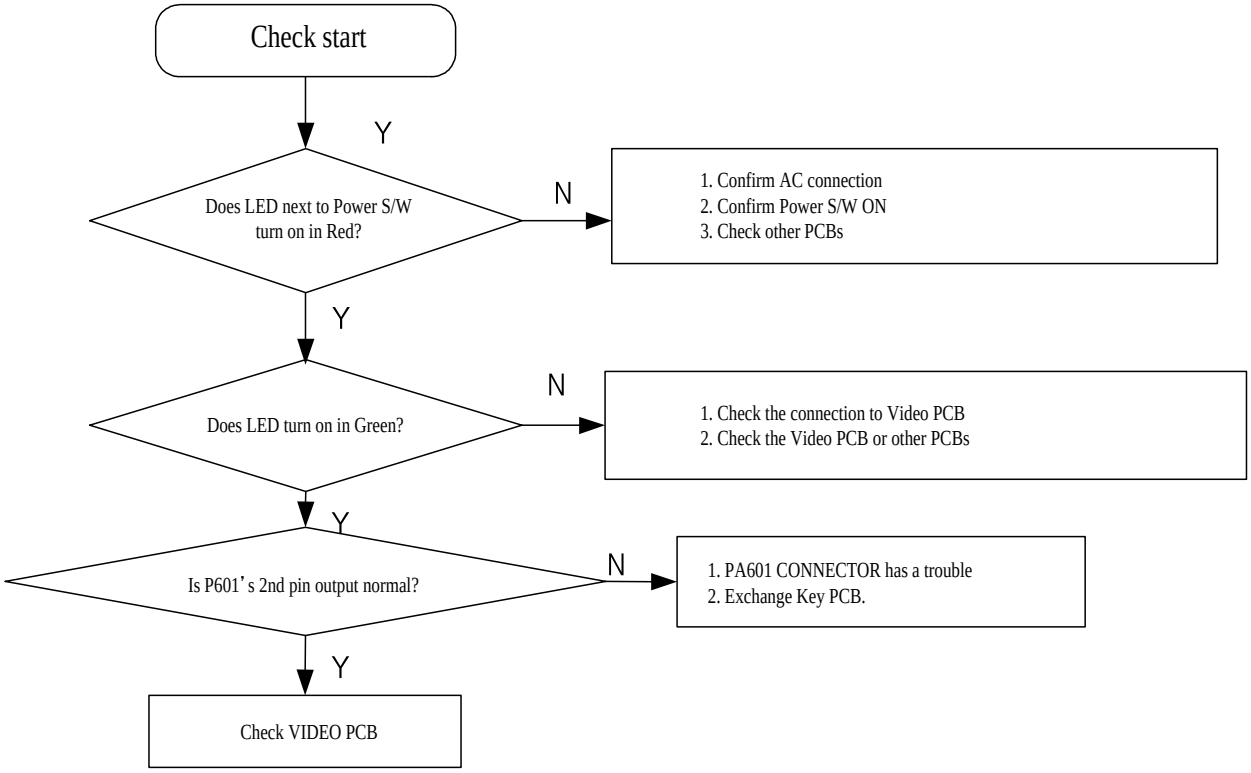
(3) TP GHS . GVS . GCLK Check

→ GHS . GVS . GCLK signal do not appear, JACK PCB has a trouble.

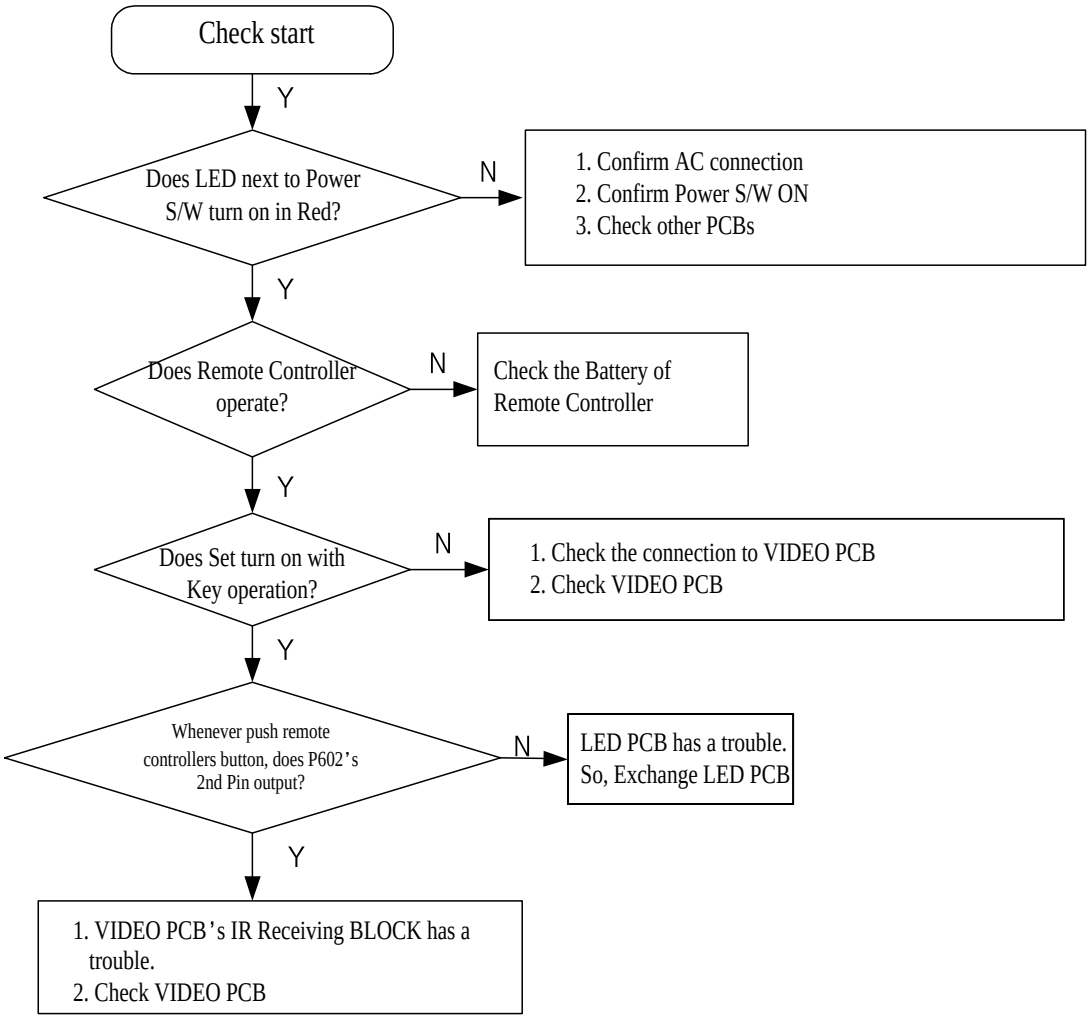
5. When No Sound


Check start
Y
Does sereen appear?
N
1. Confirm AC connection
2. Confirm Power S/W ON
3. Check Video or other PCBs
Y
Is the Sound input Jack correctly connected?
N
Check the connection of Jack(PDP or AV device)
Y
Is the Speaker correctly connected?
N
Check the connection of Speaker
Y
Is TP L_OUT or R_OUT normal?
N
IC704(CXA2069) has a trouble. So, exchange JACK PCB.
Y
Is TP RIGHT or LEFT normal?
N
IC 700 (MSP3420)has a trouble. So, exchange JACK PCB.
Y
Is JP708's SOUND output JACK PCB normal?
N
IC701 IC702 (TDA7480)has a trouble. So, exchange JACK PCB.
Y
SPEAKER or SOUND CABLE has a trouble. So, exchange SPEAKER or SOUND CABLE

6. When Key does not operate



7. When Remote Controller does not operate


Check start
Y
Does LED next to Power S/W turn on in Red?
N
1. Confirm AC connection
2. Confirm Power S/W ON
3. Check other PCBs
Y
Does Remote Controller operate?
N
Check the Battery of Remote Controller
Y
Does Set turn on with Key operation?
N
1. Check the connection to VIDEO PCB
2. Check VIDEO PCB
Y
Whenever push remote controllers button, does P602's 2nd Pin output?
N
LED PCB has a trouble. So, Exchange LED PCB
Y
1. VIDEO PCB's IR Receiving BLOCK has a trouble.
2. Check VIDEO PCB

9-2. DIGITAL PCB Trouble Diagnosis

(* Check voltage using MULTIMETER(DC voltage measure MODE), Refer to FIG<9-1> for check point position)

1. Turn Power "OFF" → Turn HIGH VOLTAGE Switch of POWER PCB "OFF" → Turn the Power "ON".

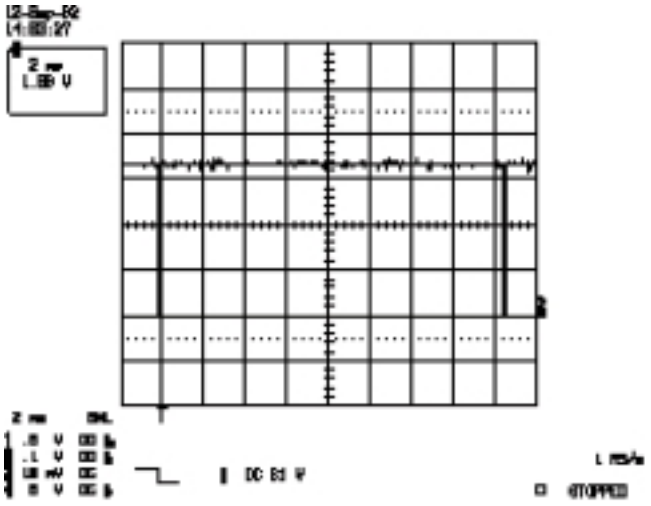
2. Check POWER CONNECTOR(P301A) for 5V, 3.3V input.
   (1)5V input(1st and 2nd pin from the top) : Normal if 4.8V~5.2V
   (2)3.3V input(6th and 7th pin from the top) : Normal if 3.2V~3.6V

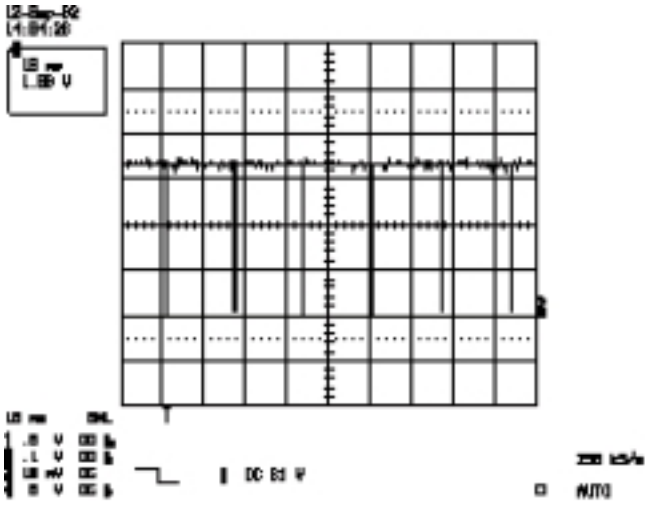
3. Check the POWER related TP 2.5V, 3.3V_1~ 2, 5V_1~6 .
   (1)2.5V : Normal if 2.3V ~2.7V
   (2)3.3V_1~2 : Normal if 3.2V~3.6V
   (3)5V_1~6 : Normal if 4.8V~5.2V

4. Check RESET, V_MUTE
   (1)S_RESET : Normal if 3.2V~3.6V
   (2)V_MUTE : Normal if 3.2V~3.6V

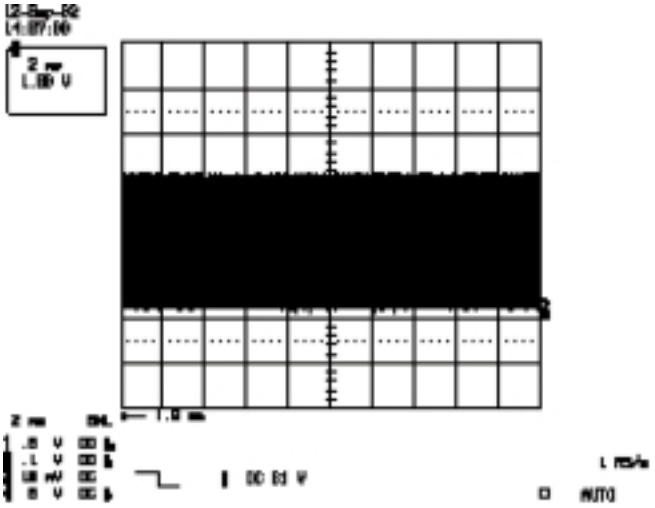
5. Normal output waveform for main signal point when using Digital Oscilloscope(refer to below pictures).

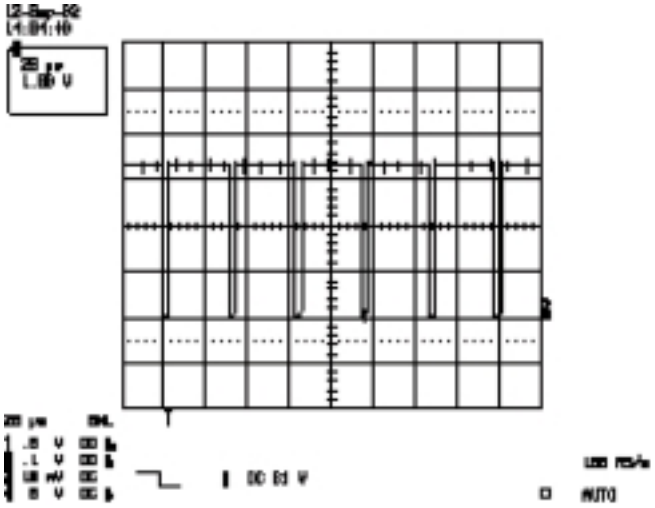
(1)DVS



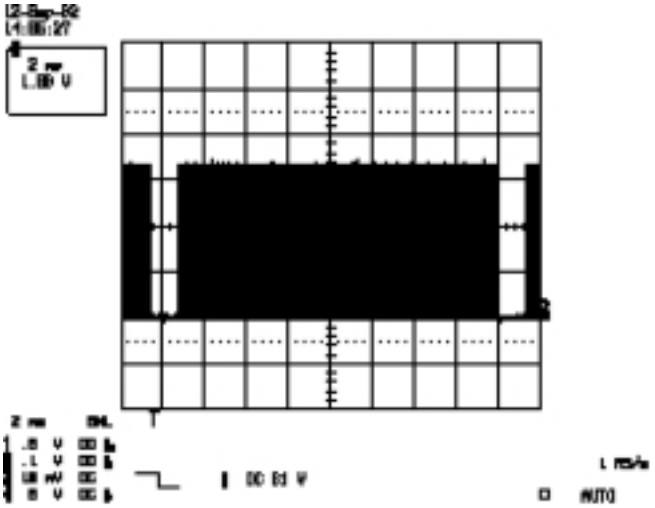


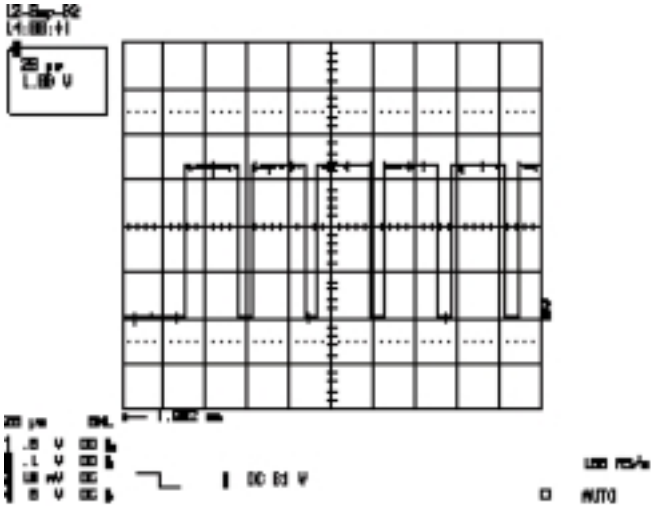
(2)DHS



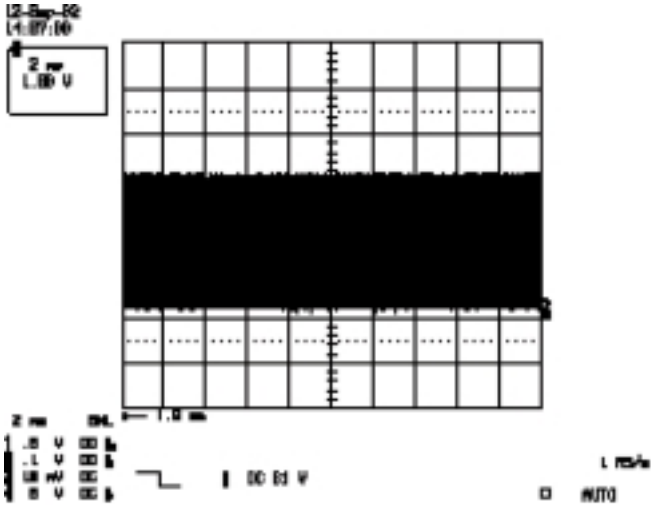


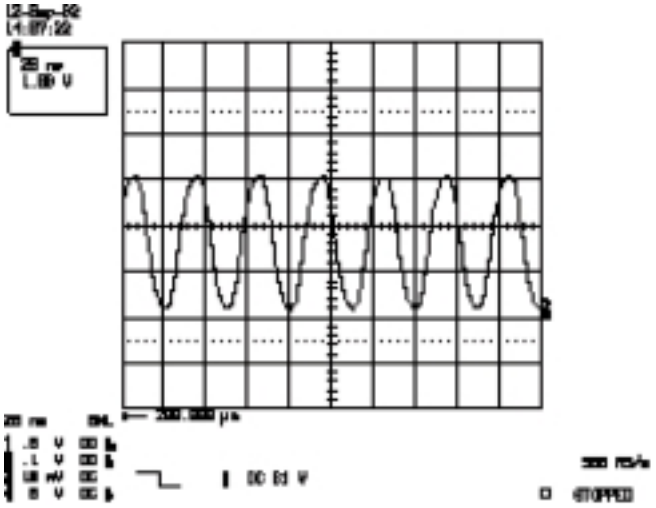
(3)DEN



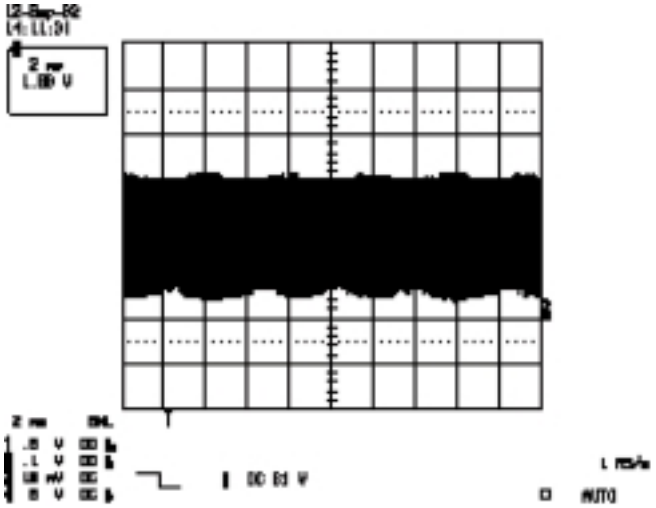


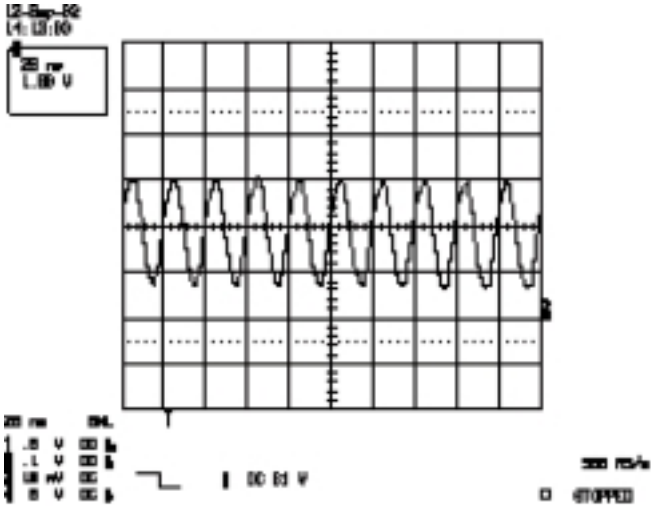
(4)DCLK



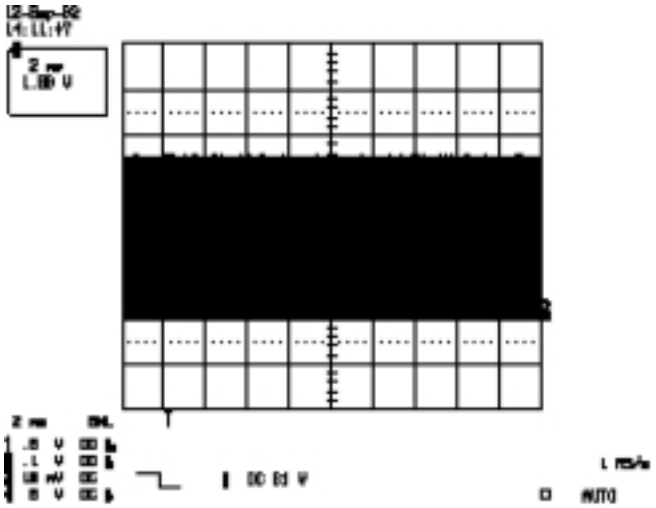


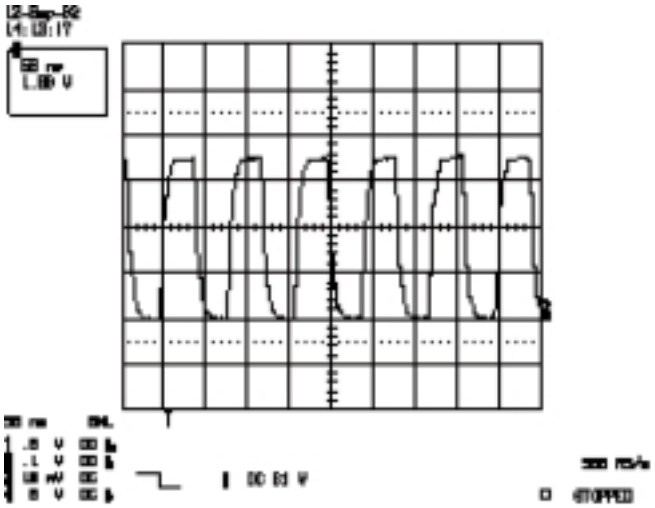
(5)CLK50M



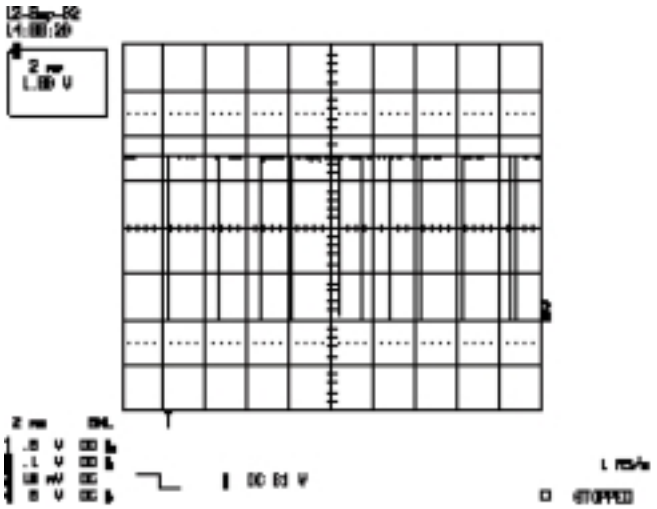


(6)M_CLK

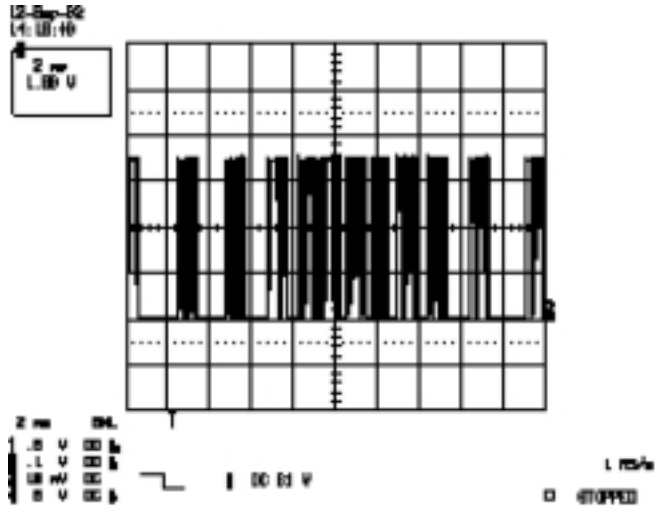




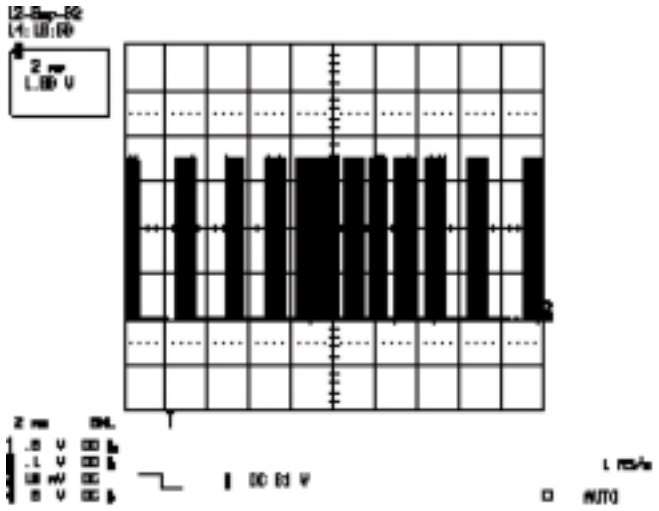
(7)F_SUBF



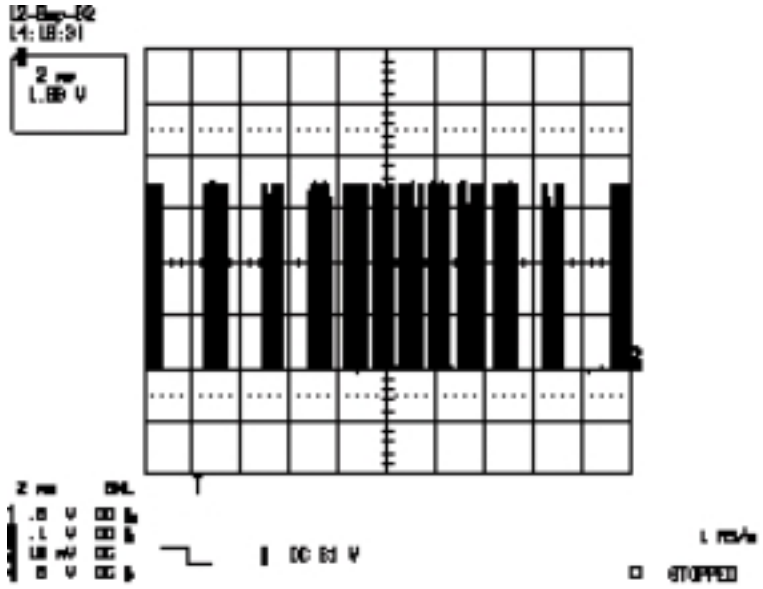
(8)CLK480



(9)SLCT

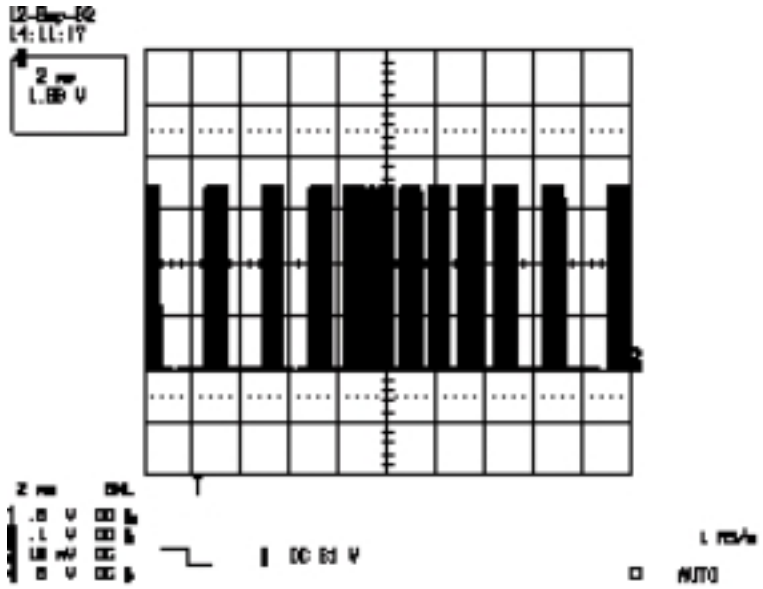


(10) F_32SFT



(11) STILL : Continuously Maintaining 0 V

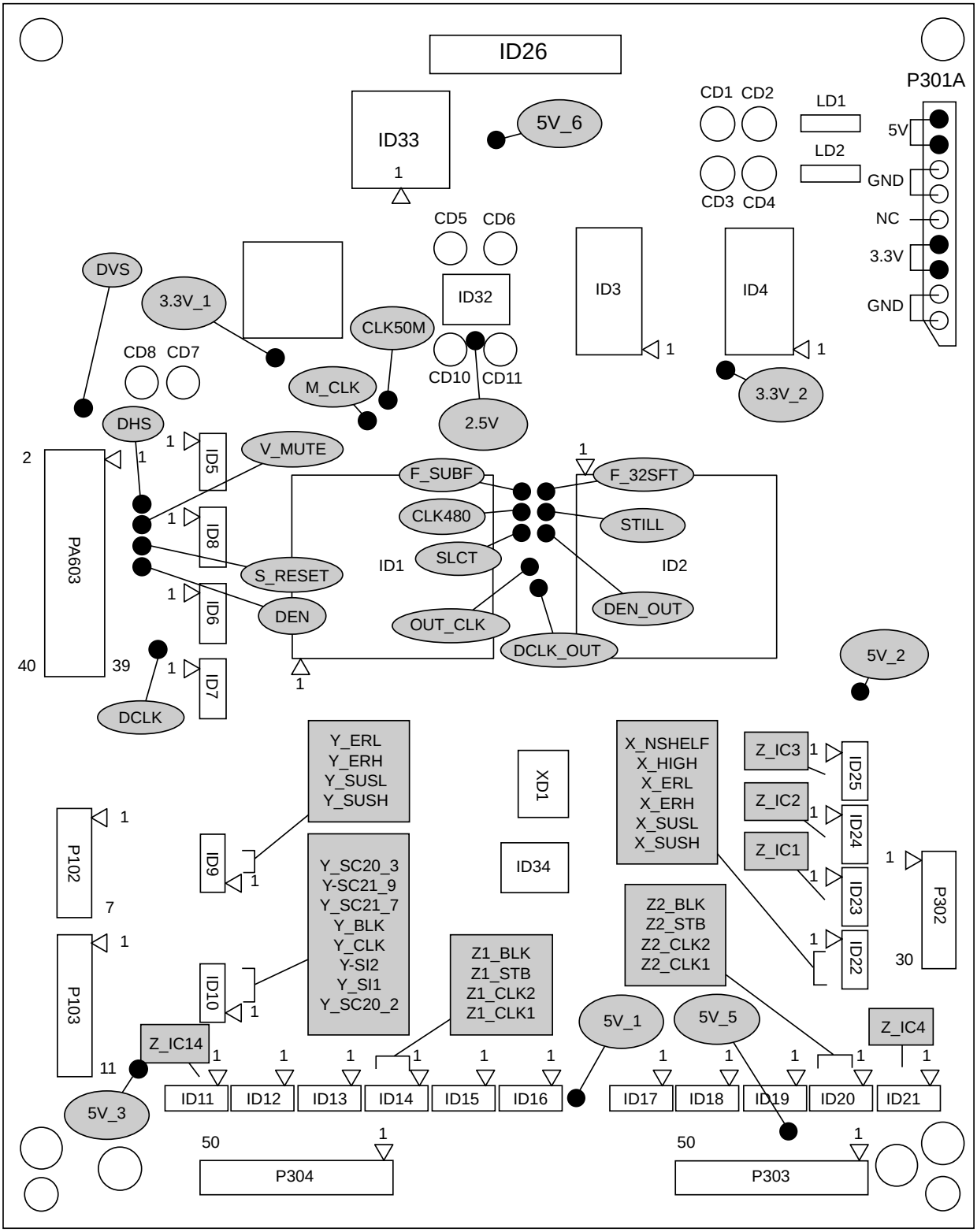
(12) OUT_CLK



(13) DEN_OUT : (3) Same as DEN (DELAY form of DEN)

(14) DCLK_OUT : (4) Same as DCLK (Only phase is different from DCLK)

FIG<9-1 >. DIGITAL PCB LAYOUT



9-3. X-SUS PCB Trouble Diagnosis

1. After disconnect P201A CONNECTOR, turn on the power.

2. If the power turn on normally, check X_SUS PCB.

3. Disconnect P202A Connector.

4. Check remaining voltage of P201A. Current model contains "Discharge Resistance" for discharging High Voltage (Vsus, Vadd) remaining inside the POWER PCB. Therefore, when dozen or more remaining voltage is measured, it could be POWER PCB failure.

   1) Vsus (173V) Voltage CHECK: When keeping above 10 volt, Using not less than 1K ohm 5 Watt resistance to discharge remaining voltage.(Under 5 volt)
   2) Vadd (68V) Voltage CHECK: When keeping above 10 volt, Using not less than 1K ohm 5 Watt resistance to discharge remaining voltage.(Under 5 volt)

5. Check the Connectors Connection.

6. If no fault detected from above tests, do the following.

   (1)Use DIODE TESTER reffering to the following Table.1~4.
   (2)If abnormal components CHECK, then replace X-SUS PCB.
   (3)If NORMAL, Check the Connectors' Connection again.

(Table 1.) Diode Tester Measure Value of PA7's Each Terminal

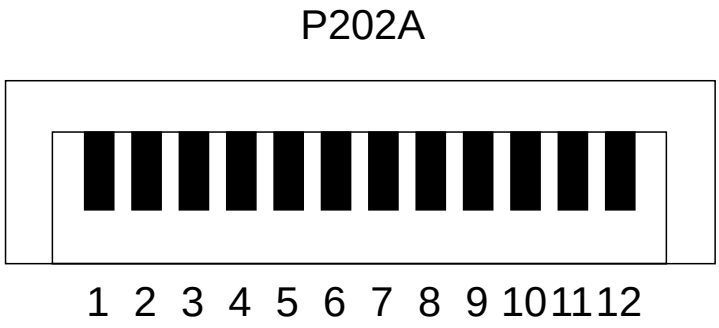
◆ + : red, - : black

	NAME	DIODE TESTER	MEASURE	DIODE TESTER	MEASURE
1	173V	+	Open	-	Over 0.7V
	GND	-		+	
2	15V	+	Over 1.9V	-	Over 0.4V
	GND	-		+	
3	Vadd	+	Open	-	Open
	GND	-		+	

(Table 2.) Diode Tester Measure Value of P202A's Each Terminal

◆ + : red, - : black

Terminal Shape :(Top view, components side)



◆ PIN 6/7/10/11 is GND

DIODE TESTER		MEASURE	DIODE TESTER		MEASURE
-	+		+	-	
GND	1	After about 15 sec, Over 1.6V	GND	1	Over 0.4V
	2	Over 1.9V		2	Over 0.8V
	3	Over 1.9V		3	Over 0.8V
	4	Over 1.9V		4	Over 0.8V
	5	Over 1.9V		5	Over 0.8V
	8	OPEN		8	Over 0.8V
	9	OPEN		9	Over 0.8V
	12	OPEN		12	OPEN

(Table 3.) FET Diode Tester Measure Value

◆ + : red, -: black

	Location	NAME	DIODE TESTER	MEASURE	DIODE TESTER	MEASURE
1	QU19-QU20	D	+	After about 5 sec, Over 2.2V	-	Over 0.5V
		S	-		+	
2	QU15-QU18	D	+	Open	-	Over 0.4V
		S	-		+	

(table 4.) When HIC Diode test, do as the method equal to Y-SUSPCB Check (refer to 9-4)

♣ Note after X_SUS PCB Repair

- Make sure to check power module' s high voltage (Vsus, Vadd). If remaining voltage detected, use resistance to discharge them.
- Make sure to check Connector(Power Connector, Signal Connector)' s Connection
- Check Panel' s FPC and Connector PU1~6 's Connection
- After replacing X_SUS PCB, readjust Vshelf as Optimum adjusting Voltage Table located above VIDEO PCB.
- Make sure to check screw connection between X-SUS PCB and Panel back-plate.
- When using scope to check signals, GND terminal must be attached to HEAT SINK.

9-4. Y-SUS PCB Trouble Diagnosis

1. After detach SCAN PCB from Y_SUS PCB, turn on the power.
2. If turn on normally, check SCAN PCB.

➜ Detach just SCAN PCB from Y-SUS PCB and perform DIODE TESTER measurement as below.

	NAME	DIODE TESTER	MEASURE	DIODE TESTER	MEASURE
1	Vpp	+	Open	-	Over 0.4V
	Vss	-		+	
2	Vpp	+	Open	-	Over 0.6V
	TP	-		+	
3	TP	+	Open	-	Over 0.5V
	Vss	-		+	

➜ If SCAN PCB failure is still estimated after above DIODE TESTER measurement, connect only one of SCANL and SCANH PCB to Y-SUS PCB and set POWER PCB's condition to LOW-Voltage. After that, perform DC-VOLTAGE TESTER Measurement as following table.

	NAME	DIODE TESTER	MEASURE	DIODE TESTER	MEASURE
1	Vpp	+	Over 38V	-	Under -38V
	Vss	-		+	
2	Vpp	+	-0.8V	-	Under 0.8V
	GND	-		+	
3	Vss	+	Under -39V	-	Over 39V
	GND	-		+	

3. If SCAN PCB is normal and "Power Shut Down" happens, then disconnect P101A and then turn on the power.
4. If power turn on normally, check Y-SUS PCB.
5. Disconnect P102A, P103A Connectors.
6. Check remaining voltage of P101A. Current model contains "Discharge Resistance" for discharging High Voltage (Vsus, Vadd) remaining inside the POWER PCB. Therefore, when dozen or more remaining voltage is measured, it could be POWER PCB failure.

1) Vsus (173V) Voltage CHECK: When keeping above 10 volt, Using not less than 1 K ohm 5 Watt resistance to discharge remaining voltage.(Under 5 volt)
2) Vadd (68V) Voltage CHECK: When keeping above 10 volt, Using not less than 1 K ohm 5 Watt resistance to discharge remaining voltage.(Under 5 volt)

7. Check the Connectors Connection.
8. If no fault detected from above tests, do the following.
   (1) Use DIODE TESTER reffering to the following Table.1~4.
   (2) If abnormal components CHECK, then replace Y-SUS PCB.
   (3) If NORMAL, Check the Connectors' Connection again.

(Table 1.) Diode Tester Measure Value of P101A's Each Terminal

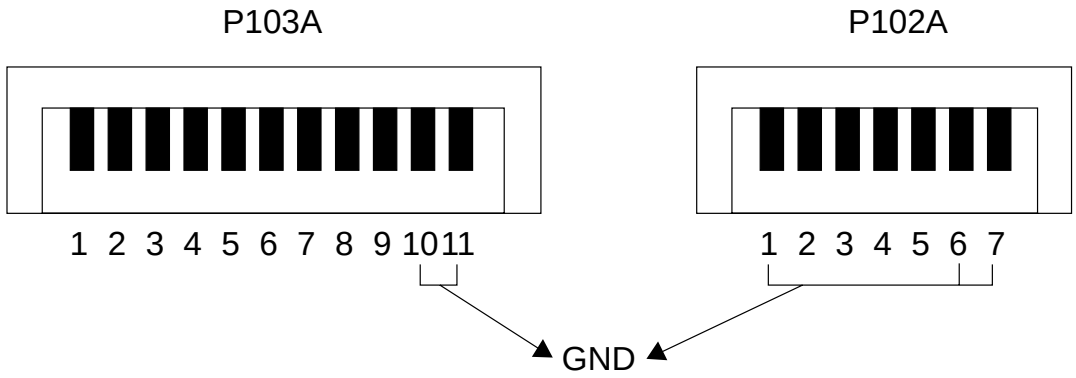
◆ + : red, - : black

	NAME	DIODE TESTER	MEASURE	DIODE TESTER	MEASURE
1	170V	+	After about 10 sec, Open	-	Over 0.7V
	GND	-		+	
2	163V	+	After about 10 sec, Open	-	Open
	GND	-		+	
3	15V	+	Over 0.5V	-	Over 0.4V
	GND	-		+	

(Table 2.) Diode Tester Measure Value of P102A and P103A's Each Terminal

◆+ : red, - : black

Terminal Shape :(Top view, components side)



P103A

DIODE TESTER		MEASURE	DIODE TESTER		MEASURE
-	+		+	-	
GND	1	Over 1.2V	GND	1	Over 0.4V
	2	OPEN		2	Over 0.8V
	3	OPEN		3	Over 0.8V
	4	OPEN		4	Over 0.8V
	5	OPEN		5	Over 0.8V
	6	OPEN		6	Over 0.8V
	7	OPEN		7	Over 0.8V
	8	Over 1.9V		8	Over 0.8V
	9	OPEN		9	Over 0.8V

P102A

DIODE TESTER		MEASURE	DIODE TESTER		MEASURE
-	+		+	-	
GND	2	Over 1.9V	GND	2	Over 0.8V
	3	Over 1.9V		3	Over 0.8V
	4	Over 1.9V		4	Over 0.8V
	5	Over 1.9V		5	Over 0.8V

(table 3.) FET Diode Tester Measure Value

◆ + : red, -: black

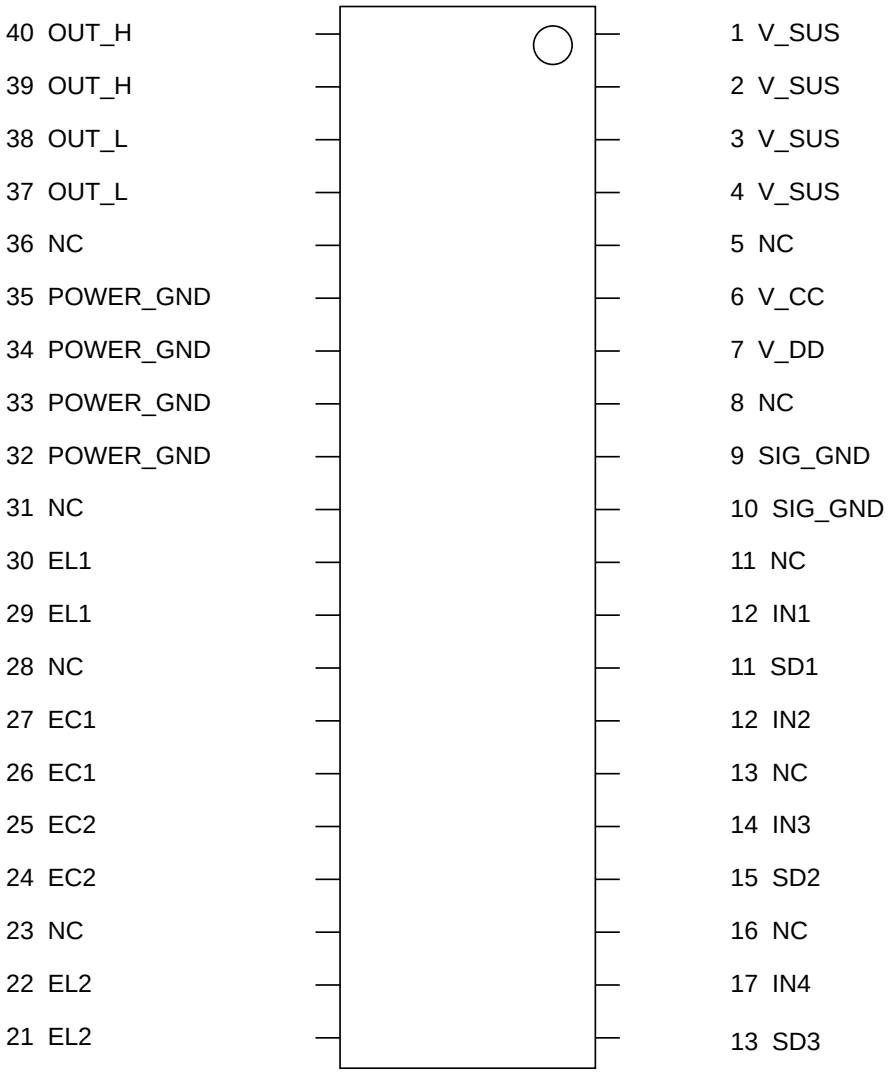
	Location	NAME	DIODE TESTER	MEASURE	DIODE TESTER	MEASURE
1	QY20-QY23	D	+	After about 3 sec, OPEN	-	Over 0.4V
		S	-		+	
2	QY7-QY12	D	+	OPEN	-	Over 0.4V
		S	-		+	
3	QY14-QY19	D	+	OPEN	-	Over 0.4V
		S	-		+	
4	QY13	D	+	OPEN	-	Over 0.4V
		S	-		+	
5	QY1-QY2	D	+	OPEN	-	Over QY1-0.4V
		S	-		+	Over QY2-0.5V
6	QY3-QY5	D	+	OPEN	-	Over 0.4V
		S	-		+	

(table 4.) HIC(Hybrid IC) Diode Tester Measure Value

◆ + : red, -: black

➞ For the HIC inside Y-SUS PCB, PIN number starts from lower right when the PCB is attached to the SET and looked from the front.

➞ For the HIC inside X-SUS PCb, PIN number starts from upper left when the PCB is attached to the SET and looked from the front.



◆ PIN9~10 and PIN17, 20, 32~35 are shorted to GND.
PIN24~27 are shorted to each other.
PIN37~40 are shorted to each other.

DIODE TESTER		MEASURE	DIODE TESTER		MEASURE
-	+		+	-	
GND	1~4	After about 15sec, OPEN	GND	1~4	Over 0.7V
	5	NC		5	NC
	6	0.5V DLTKD		6	Over 0.4V
	7	Over 1.2V		7	Over 0.4V
	8	NC		8	NC
	9~`10	GND		9~`10	GND
	11	NC		11	NC
	12	Over 1.2V		12	Over 0.5V
	13	0		13	0
	14	Over 1.2V		14	Over 0.5V
	15	NC		15	NC
	16	Over 1.2V상		16	Over 0.5V
	17	0		17	0
	18	NC		18	NC
	19	Over 1.2V		19	Over 0.5V
	20	0		20	0
	21~22	After about 10sec, OPEN		21~22	Over 0.3V
	23	NC		23	NC
	24~25	OPEN		24~25	Over 0.8V
	26~27	OPEN		26~27	Over 0.8V
	28	NC		28	NC
	29~30	After about 10sec, OPEN		29~30	Over 0.3V
	31	NC		31	NC
	32~35	GND		32~35	GND
	36	NC		36	NC
	37~38	OPEN		37~38	Over 0.3V
	39~40	OPEN		39~40	Over 0.3V

♣ Note after Y_SUSTAIN B/D REPAIR

- Make sure to check power module's high voltage (Vsus, Vyer). If remaining voltage detected, use resistance to discharge them.
- Make sure to check Connectors(Power Connector, Signal Connector, Connector between SCAN PCB and Y-SUS PCB)'s Connection.
- After replacing Y_SUS PCB, readjust Vramp_up, Vscan Voltage and Slope of Ramp_up, Ramp_down as Optimum adjusting Voltage Table located above VIDEO PCB. (Refer to 6-2-3)
- Make sure to check screw connection between X-SUS PCB and Panel back-plate.
- When using scope to check signals, GND terminal must be attached to HEAT SINK

9-5. CONNECTION PCB & DATA COF Trouble Diagnosis

1. If vertical line is missing or the discharge is other than bar shape on the screen, check CONNECTION and DATA COF.

2. Check CONNECTION and/or DATA COF if following.
   When P202 is connected, if Vadd and/or 5V is not supplied normally.
   But, when separated, Vadd and/or 5V is supplied normally.

   → If this is the case, check each connectors connection. (Check if there isn't any extraneous material between the Connector pins. Check whether cables and FPC are correctly connected)
   → Check the chip resistance(four parallel connected "47 ohm") located left and right of each PC 1~7 of CONN-LEFT/RIGHT PCB to see if open/short circuit..
   → If all above are normal, unscrew DATA COF and observe DIODE TESTER.
   : Check C 5 ~ 8 → If over 0.4V, Normal.
   C 1~4 → If over 0.45V, Normal.

9-6. POWER PCB Trouble Diagnosis

◆ Although X-SUS / Y-SUS / SCAN / DATA COF are checked, but still the set does not operate, and then check if the following Power PCB's Trouble Symptoms appear.

→ After unplugging X-SUS / Y-SUS PCB's Power Connectors(P101A, P201A) and checking remaining voltage, there still exist several tens of remaining voltage.

→ When output condition of Power Module is set to LOW-Voltage, output voltage table lists 4~10 are NOT normal. Or when set to HIGH-Voltage, output voltage table list 1~3 are NOT normal. (Refer to 4-3-2)

→ When output condition of Power Module is set to LOW-Voltage, output voltage table lists 4~10 are normal. But when set to HIGH-Voltage, output voltage table list 1~3 are NOT normal. (Refer to 4-3-2)

→ After turn SET on with Remote Controller when output condition of Power Module is set to HIGH-Voltage, the LED turn "Green" but the "Power Shut Down" happens after 2~3 seconds.

◆ If high voltage(Vsus, Vyer, Vadd) measured from Power PCB is different from that of Optimum adjusting Voltage LABEL, readjust the voltages referring to "6-2-1. Adjusting Power PCB"

10. TROUBLE SHOOTING

10-1. Facts you must know when Trouble diagnosis or repairing

(1) Set's trouble diagnosis and repairing means "Module Exchange". In other words, find out which PCB modules are not working and replace them with normal PCB modules. Do not need to fix broken PCB modules in themselves.

(2) This TROUBLE SHOOTING list only contains representative and simple PCB trouble diagnosis and Module Exchange method. Therefore, if you find Sets that are difficult to diagnose or to repair, contact Daewoo Electronics.

(3)Basic TROUBLE SHOOTING procedure

Check Trouble Symptom → Detach BACK COVER → Trouble Diagnosis →replace broken PCB module → Adjust new PCB module (when replacing X-SUS, Y-SUS, POWER, VIDEO PCB, need Adjusting Prodedure. Refer to 6. Adjusting Method) → HEATRUN (for at least 30 minutes, input TEST PATTERN FULL WHITE), FUNCTION CHECK → Repair Complete.

(4)Keep broken PCB modules separately for replacing with new PCB modules.

(5)Required equipments for trouble diagnosis

- DIGITAL MULTIMETER (User Mode : measure DC VOLTAGE, measure DIODE VOLTAGE, SHORT-OPEN TEST)
- Screwdriver (or electric screwdriver), plastic adjusting tool

(6) Each BLOCK operation was explained including DIGITAL OSCILLOSCOPE signal, but this is reference only and applying them for repair is not necessary. (After additional education, DIGITAL OSCILLOSCOPE could be used)

(7) Before assemble/disassemble PCBs, check to see if AC Switch is "OFF".

(8) After replacing X-SUS, Y-SUS, POWER, VIDEO PCB, the PCB, needs extra adjustment. (Refer to Service Manual 6. Adjusting Method)

(9) After the set is repaired, leave BACK COVER open for followings. Do HEATRUN for at least 30 minutes by inputting SERVICE MODE's TEST PATTERN (Refer to Service Manual 5. Service Mode) FULL WHITE. Check the screen condition and basic functions (remote control operation etc.).

(10) After BACK COVER is closed, redo HEATRUN for at least one hour by inputting FULL WHITE using SERVICE MODE's TEST PATTERN. Check the screen condition and basic functions.

10-2. Typical Symptoms of PCB's Trouble or bad CONNECTION

(1)Symptoms of X-SUS or Y-SUS PCB 's Trouble

<Symptom.1> Not even weak discharge (luminescence) shows on screen.

<Symptom.2> Discharge (luminescence) on screen is unstable (refer to Trouble Symptom Picture<8>)

<Symptom.3> Set is producing unusual noise.

<Symptom.4> POWER SHUT DOWN occur (refer to Service Manual 10-3)

(2)Symptoms of SCAN PCB Trouble

(Note.1) SCAN PCB is divided into SCANH PCB (drive upper screen) and SCANL PCB (drive lower screen). Each SCAN PCB contains four (64 PIN Output) SCAN DRIVER IC. SCANH PCB drives upper 240 lines out of 480 total lines and SCANL PCB drives lower 240 lines. Therefore, if either screen's upper or lower part is abnormal, then it is possible that one of SCANH PCB or SCANL PCB is broken or having a bad CONNECTION.

(Note.2) When SCAN PCB has some problems, those are most likely bad CONNECTOR CONNECTION caused by dust or extraneous material. Therefore, check the condition of CONNCETOR CONNECTION before diagnoses the PCB.

<Symptom.1> Horizontal lines (BLACK or irregular data, group or single) occur. (refer to Trouble Symptom Picture <5> ~ <12>)

<Symptom.2> Upper and lower screen overlap each other. (Upper data influence lower data, refer to Trouble Symptom Picture <8>)

<Symptom.3> Not even weak discharge (luminescence) shows on screen.

<Symptom.4> Discharge (luminescence) on screen is unstable (refer to Trouble Symptom Picture <8>)

<Symptom.5> POWER SHUT DOWN occur (refer to Service Manual 10-3)

(3)Symptoms of DATA COF Trouble

(Note.1) DATA COF consists of total 7 PADs in a SET. Each COF PAD consists of total four "96 PIN output DATA DRIVER IC", which drives one-seventh part in total 2559(=853*3(R,G,B)) vertical lines. Therefore, if specific screen part is abnormal it is likely that particular DATA COF is broken or BAD CONNECTION. Moreover, DATA COF is connected to DATA Electrode (Z Electrode : Vertical Direction) of PANEL by HEAT COMPRESSION Processing. So, if DATA COF has a trouble, the entire PANEL must be replaced.

(Note.2) DATA COF's Trouble is more likely caused by BAD CONNECTOR CONNECTION due to dust or extraneous material. Therefore, make sure to check the related CONNECTOR CONNECTION.

<Symptom.1> Vertical line (BLACK or abnormal data, group or single) occur (refer to Trouble Symptom Picture <1> ~ <4>)

<Symptom.2> For particular vertical BLOCK, Discharge (luminescence) is unstable or not operating. (refer to Trouble Symptom Picture <2>, <4>)

<Symptom.3> POWER SHUT DOWN occur (refer to Service Manual 10-3)

(4)Symptoms of POWER PCB Trouble

<Symptom.1> Not even weak discharge (luminescence) shows on screen.

<Symptom.2> Discharge (luminescence) on screen is unstable (refer to Trouble Symptom Picture<8>)

<Symptom.3> Set is producing unusual noise

<Symptom.4> POWER SHUT DOWN occur (refer to Service Manual 10-3)

(5)Symptoms of DIGITAL PCB Trouble

(Note) DIGITAL PCB produces CONTROL SIGNALs for normal operation of Driving BLOCK(X-SUS,Y-SUS,SCAN,DATA). Trouble of this PCB could generate further damage to Driving BLOCK circuit. In other words, if Driving BLOCK CONTROL SIGNALs are abnormal, all kinds of trouble symptoms of PCBs within Driving BLOCK could occur.

<Symptom.1> Not even weak discharge (luminescence) shows on screen.

<Symptom.2> Discharge (luminescence) on screen is unstable (refer to Trouble Symptom Picture<8>)

<Symptom.3> Screen DATA is abnormal

<Symptom.4> POWER SHUT DOWN occur (refer to Service Manual 10-3)

(6)Symptoms of VIDEO or JACK PCB Trouble

<Symptom.1> Only weak discharge (luminescence) shows on screen, but No Data is on screen

<Symptom.2> Screen DATA is abnormal

<Symptom.3> Particular input signal (Video, PC or Component etc.) does not operate

<Symptom.4> No SOUND

<Symptom.5> The Set does not operate normally. But, after turn off AC Power, if turn on again, it operates normally again.

<Symptom.6> Remote Control or KEY does not operate

<Symptom.7> POWER SHUT DOWN occur (refer to Service Manual 10-3)

(7)Symptoms of CONN-LEFT & CONN-RIGHT PCB

(Note) CONN-LEFT & CONN-RIGHT PCB are to distribute Driving power (5V, Vadd) provided by POWER PCB and CONTROL SIGNAL/DATA provided by DIGITAL PCB to each PCB(X-SUS, Y-SUS, SCAN, DATA). This PCB contains simple components such as BUFFER IC, resistors, capacitor etc. Therefore the trouble is most likely caused by bad CONNECTOR CONNECTION due to dust or extraneous material.

<Symptom.1> Vertical line (BLACK or abnormal data, group or single) occur (refer to Trouble Symptom Picture <1> ~ <4>)

<Symptom.2> For particular vertical BLOCK, Discharge (luminescence) is unstable or not operating. (refer to Trouble Symptom Picture <2>, <4>)

<Symptom.3> All possible symptoms when X-SUS, Y-SUS, or SCAN PCB has a trouble.

(8)Representative Symptoms caused by bad CONNECTION between PCBs.

(Note) Dust or extraneous materials most likely to cause bad CONNECTION. Most of this case, it can be solved if using soft brush, AIR FRESHER, or breath to clean dust or extraneous materials or reassemblling the Connector.

① VIDEO ➞ DIGITAL (P603 ➞ PA603)

- Possible Symptoms when VIDEO or DIGITAL PCB has a trouble

② DIGITAL ➞ Y-SUS (Y-CONTROL : P102 ➞ P102A, P103 ➞ P103A)
- Possible Symptoms when Y-SUS PCB or SCAN PCB has a trouble

③ DIGITAL ➞ CONN-LEFT (P304 ➞ P304A)
- Possible Symptoms when DATA COF(1st ~ 3rd PAD from left) or CONN-LEFT PCB has a trouble (refer to Trouble Symptom Picture <2> ~ <4>)

④ DIGITAL ➞ CONN-RIGHT (P302 ➞ P302A, P303 ➞ P303A)
- Possible Symptoms when DATA COF(4th ~7th PAD from left) or CONN-RIGHT PCB has a trouble (refer to Trouble Symptom Picture <1>)
- Possible Symptoms when X-SUS PCB has a trouble (P302 ➞ P302A CONNECTION contains X-SUS PCB CONTROL SIGNAL as well as DATA. So if this CONNECTION is bad, X-SUS PCB might not operate).

⑤ CONN-RIGHT ➞ X-SUS (X-CONTROL : P202 ➞ P202A)
- Possible Symptoms when X-SUS PCB has a trouble.
- Only weak discharge (luminescence) shows on screen. But, No Data ison screen. (P202 ➞ P202A CONNECTION contains Vadd power source as well as X-CONTROL. So, if this CONNECTION is bad, the problem could be caused by incorrect power supply to DATA COF)

⑥ CONN-LEFT/RIGHT ➞ DATA COF (Z_DATA/CONTROL : PC1~7)
- Possible Symptoms when DATA COF has a trouble.
  (refer to Trouble Symptom Picture <1> ~ <4>)

10-3. Trouble Diagnosis and Repairing Method for Representative Symptoms

(1)When POWER SHUT DOWN occurs

<1> Definition of "SHUT DOWN"

- When LED Color is Green, can't hear POWER operating sound. (Red : STAND BY, Green : Operating)
- When Turn OFF and turn ON AC SWITCH again, and turn Remote Control POWER "ON", POWER RELAY do not operate normally, and POWER operating sound can not be detected.

<2> PCB Check Priority (Left to Right)

- POWER, X-SUS, Y-SUS, SCANL/H, DATA, DIGITAL, VIDEO, CONN-LEFT/RIGHT

<3> Trouble Repairing Procedure

- As shown in FIG<10-1>, first check which of "LOW VOLTAGE" part or "HIGH VOLTAGE" part has a trouble.
- If "LOW VOLTAGE" part is broken is checked, as shown in FIG<10-2> diagnose the SET and then replace the broken PCB.
- If "HIGH VOLTAGE" part is broken is checked, as shown in FIG<10-3> diagnose the SET and then replace the broken PCB.
- <Note.1> When disconnecting/connecting connectors, you must turn "OFF" the AC power and check the direction/position of them before working.
- <Note.2> If you turn the SET "ON" with X-SUS PCB and Y-SUS PCB's POWER CONNECTORS (P101A, P201A) disconnected, although you turn the SET "OFF" again, Remaining Voltage still exists in the POWER PCB. Therefore assemble the connectors several minutes after. Or, check the Remaining Voltage (Vsus, Vadd) by multimeter. If Vsus is less 10V, connect connectors. Connecting connectors with the Remaining Voltage (Vsus,Vadd) over 10V could generate sparks and be dangerous to Operators or SET.

(2)When Screen Discharge (luminescence) is abnormal

<1> Definition of "Abnormal Screen Discharge (luminescence)"

- In Entire or part of screen, irregular and unstable Discharge arises. (Refer to Trouble Symptom Picture<8>)
- This symptoms are divided into "No Discharge" and "Wrong Discharge"
- No Discharge : Pixels which should discharge do not emit light. When WHITE PATTERN is displayed, one of RED, GREEN, BLUE does not emit light, so CYAN(GREEN+BLUE), MAGENTA(RED+BLUE) or YELLOW(RED+GREEN) shows on some part of the screen.
- Wrong Discharge : Pixels which should not discharge emit light. When single color like RED, GREEN, BLUE pattern is displayed, CYAN(GREEN+BLUE), MAGENTA(RED+BLUE) or YELLOW(RED+GREEN) shows on some part of the screen.
- If "No Discharge" or "Wrong Discharge" is severe, it can be easily detected when any moving image is displayed. But if it is not severe, it can be detected only when certain particular

images are displayed.

<2> PCB Check Priority(Left to Right)

- X-SUS, Y-SUS, SCAN, POWER, DATA, DIGITAL, CONN-LEFT/RIGHT

<3> Trouble Repairing Procedure

- First, refer to " 6-2 Adjusting Driving Voltage and Waveform " to check if each voltage is adjusted according to 'Optimum Voltage LABEL'. If the there are voltage difference, adjust voltage according to the 'Optimum Voltage LABEL' and then check the screen.
- If voltages are adjusted correctly, perform trouble diagnosis in the order as shown in FIG<10-4> and then replace broken PCB.

(3)When Vertical or Horizontal lines (regular or irregular, single or block) occur

<1> Definition of "Horizontal Line", "Vertical Line"

- Horizontal Line/Vertical Line OPEN : Problematic line's electrode or signal line is OPEN, so it is displayed BLACK.
- Horizontal Line/ Vertical Line SHORT : Problematic line and adjoining lines are SHORTING each other creating abnormal color lines.
- Single Horizontal Line → An irregular Horizontal Line exists independently on the screen. (Refer to Trouble Symptom Picture<6>)
- Block Horizontal Line →Horizontal Line with Block Shape exists on the screen. (Refer to Trouble Symptom Picture<5>)
- Single Vertical Line → An irregular Vertical Line exists independently on the screen. (Refer to Trouble Symptom Picture<4>)
- Block Vertical Line → Vertical Line with Block Shape exist on the screen. (Refer to Trouble Symptom Picture<5>)

<2> PCB Check Priority (Left to Right)

- Horizontal Line : SCAN, Y-SUS, DIGITAL
- Vertical Line : DATA, CONN-LEFT/RIGHT, DIGITAL

<3> Trouble Repairing Procedure

- Single Vertical Line Occurrence: DATA COF or PANEL has a trouble. So replace PANEL
- Block Vertical Line Occurrence: Most of the time this is caused by bad connection due to extraneous materials or connectors not connected properly. Firstly, following Data Path, DIGITAL → CONN-LEFT/RIGHT (Among seven DATA COF PAD, CONN-LEFT PCB drives left 3(PC5~PC7), and CONN-RIGHT PCB drives right 4 DATA COFs. So, first check which one of CONN-LEFT and CONN-RIGHT drive problematic COF PAD.) → DATA COF, check the connection between each PCBs. Secondly, check if there are no dust, bits of iron, or any other extraneous material between the connectors. Thirdly, reassemble and check if the problem is solved. If the problem still exits, try to replace related PCBs one by one with the DIGITAL PCB as a start.- Single Horizontal Line Occurrence : Firstly, if the position of the line is at the upper part of the screen check SCANH PCB' s connector

connection(PS01~PS04). Otherwise check SCANL PCB's connector connection(PS05~PS08). Secondly, check if there are no dust, bits of iron, or any other extraneous material between the connectors. Thirdly, reassemble and check if the problem is solved. If the problem still exits, try to replace problematic SCAN PCB.

- Block Horizontal Line Occurrence : Firstly, check problematic SCAN PCB's (SCANH PCB if the Block Horizontal Line exists at the upper part of the screen, otherwise SCANL PCB) connector(PS01~PS08, PY01~PY04) condition. Secondly, check if there are no dust, bits of iron, or any other extraneous material between the connectors. Thirdly, reassemble and check if the problem is solved. If the problem still exits, try to replace problematic SCAN PCB.

(4)When weak Discharge exists on screen but "OSD screen" can not be seen

<1> Definition of this symptom

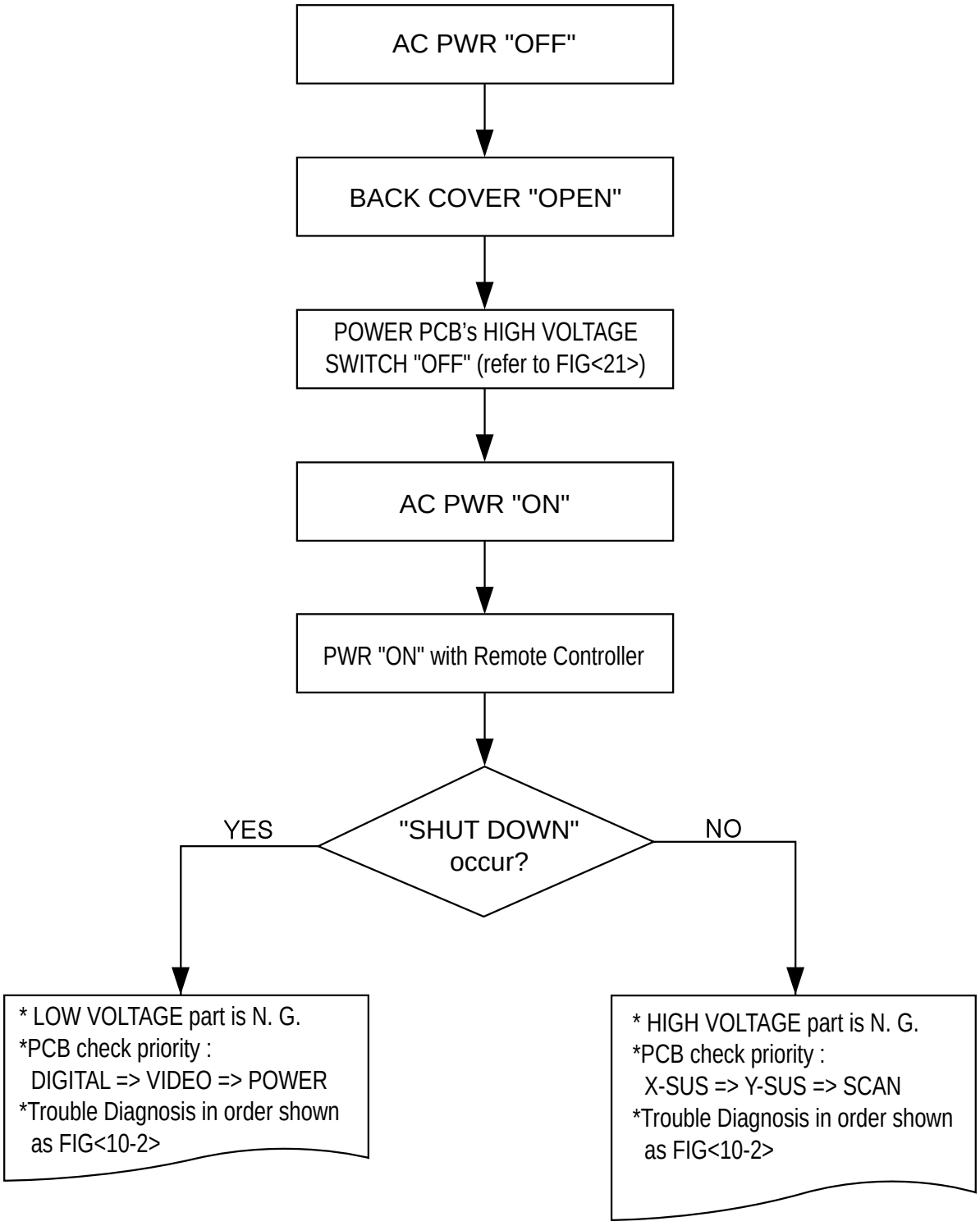
- When the set was turned on, screen is BLACK but Weak Discharge (luminescence) exists.
- When OSD does not show on screen and the set does not respond to remote controller or KEY panel's any button.

<2> PCB CHECK PRIORITY

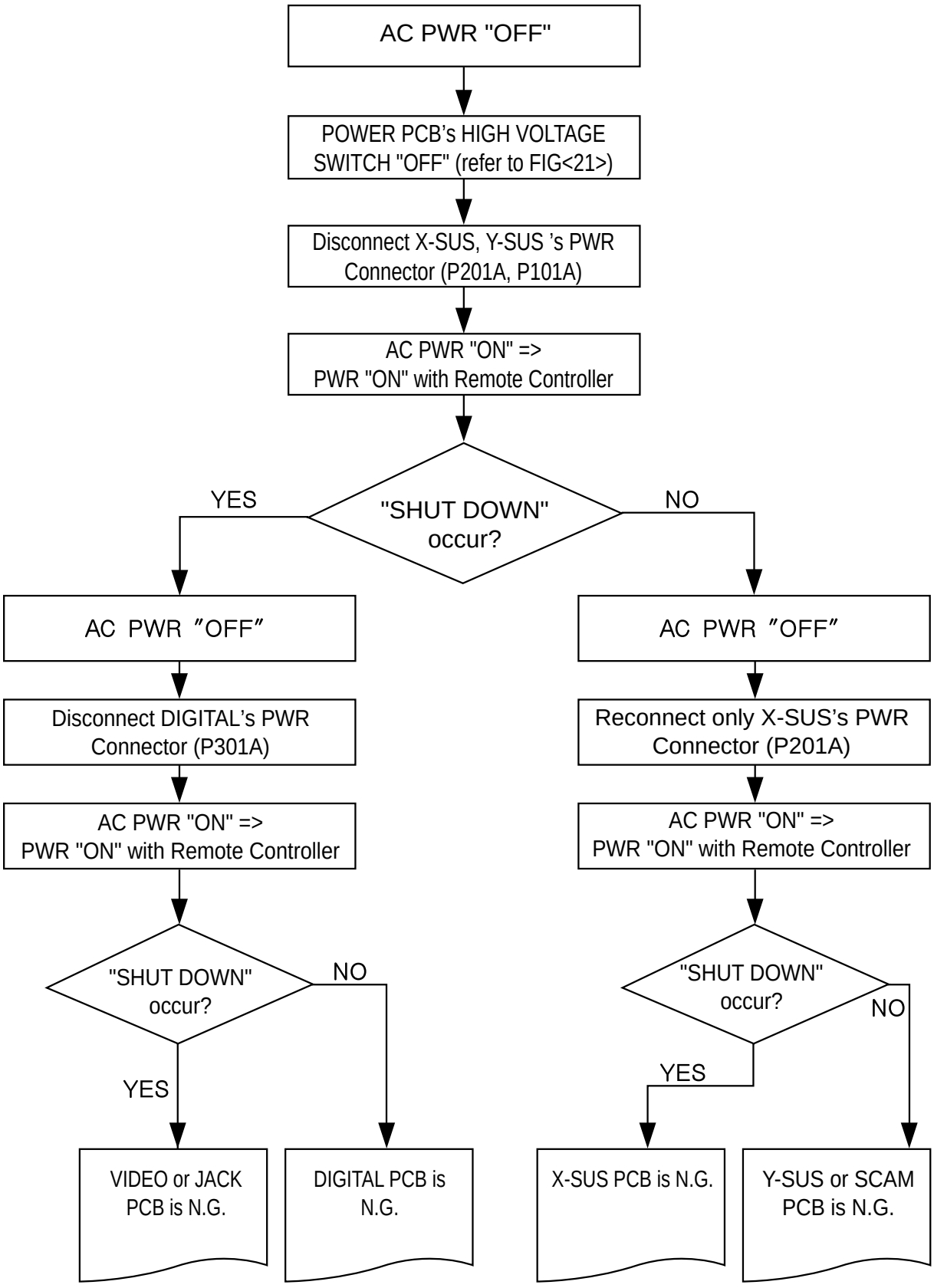
- VIDEO PCB

<3> Trouble Repairing Procedure

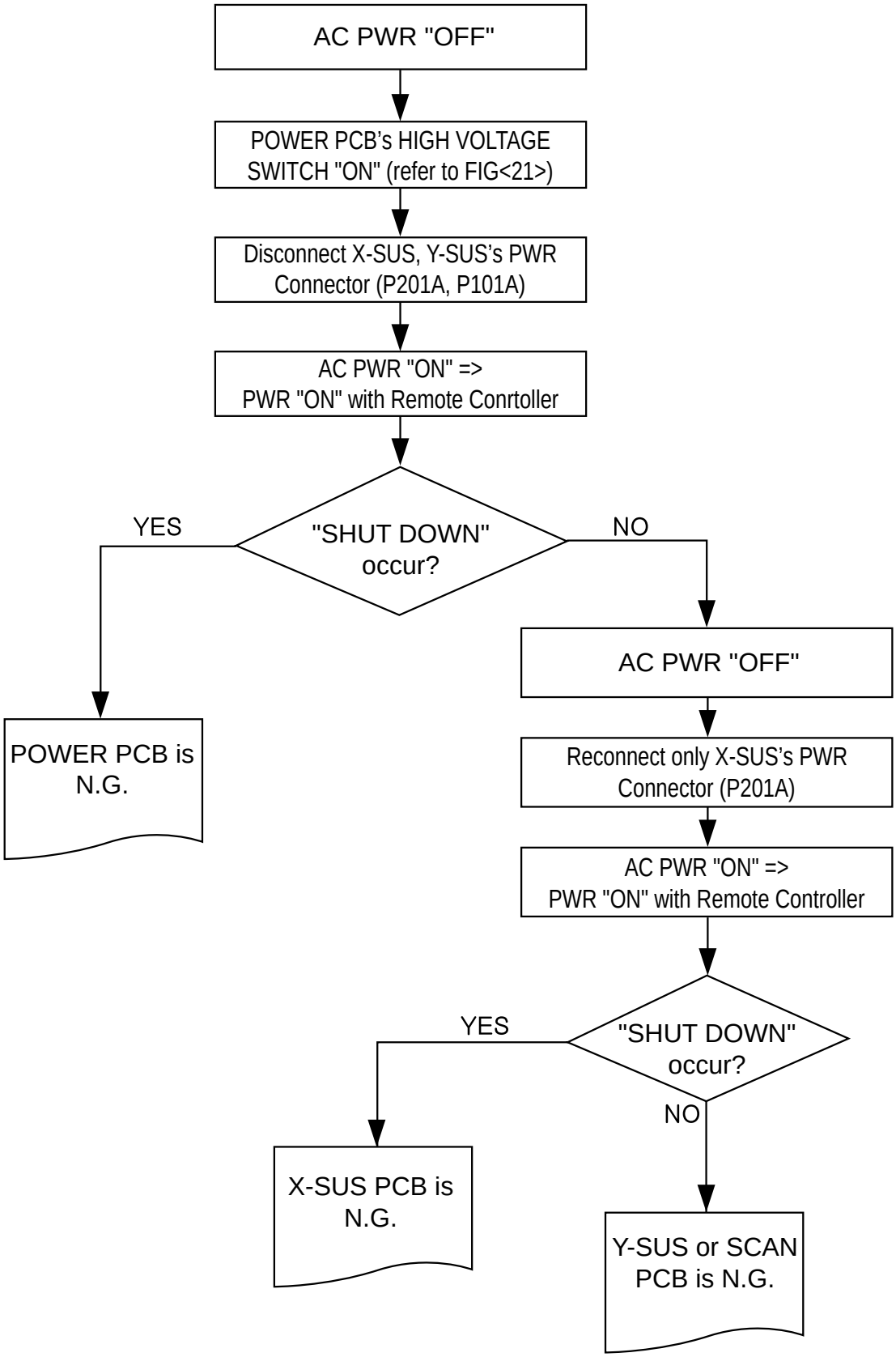
- If no problem in Connection(VIDEO ➞ DIGITAL), replace VIDEO PCB


AC PWR "OFF"
BACK COVER "OPEN"
POWER PCB's HIGH VOLTAGE SWITCH "OFF" (refer to FIG<21>)
AC PWR "ON"
PWR "ON" with Remote Controller
"SHUT DOWN" occur?
YES
NO
* LOW VOLTAGE part is N. G.
*PCB check priority :
DIGITAL => VIDEO => POWER
*Trouble Diagnosis in order shown as FIG<10-2>
* HIGH VOLTAGE part is N. G.
*PCB check priority :
X-SUS => Y-SUS => SCAN
*Trouble Diagnosis in order shown as FIG<10-2>

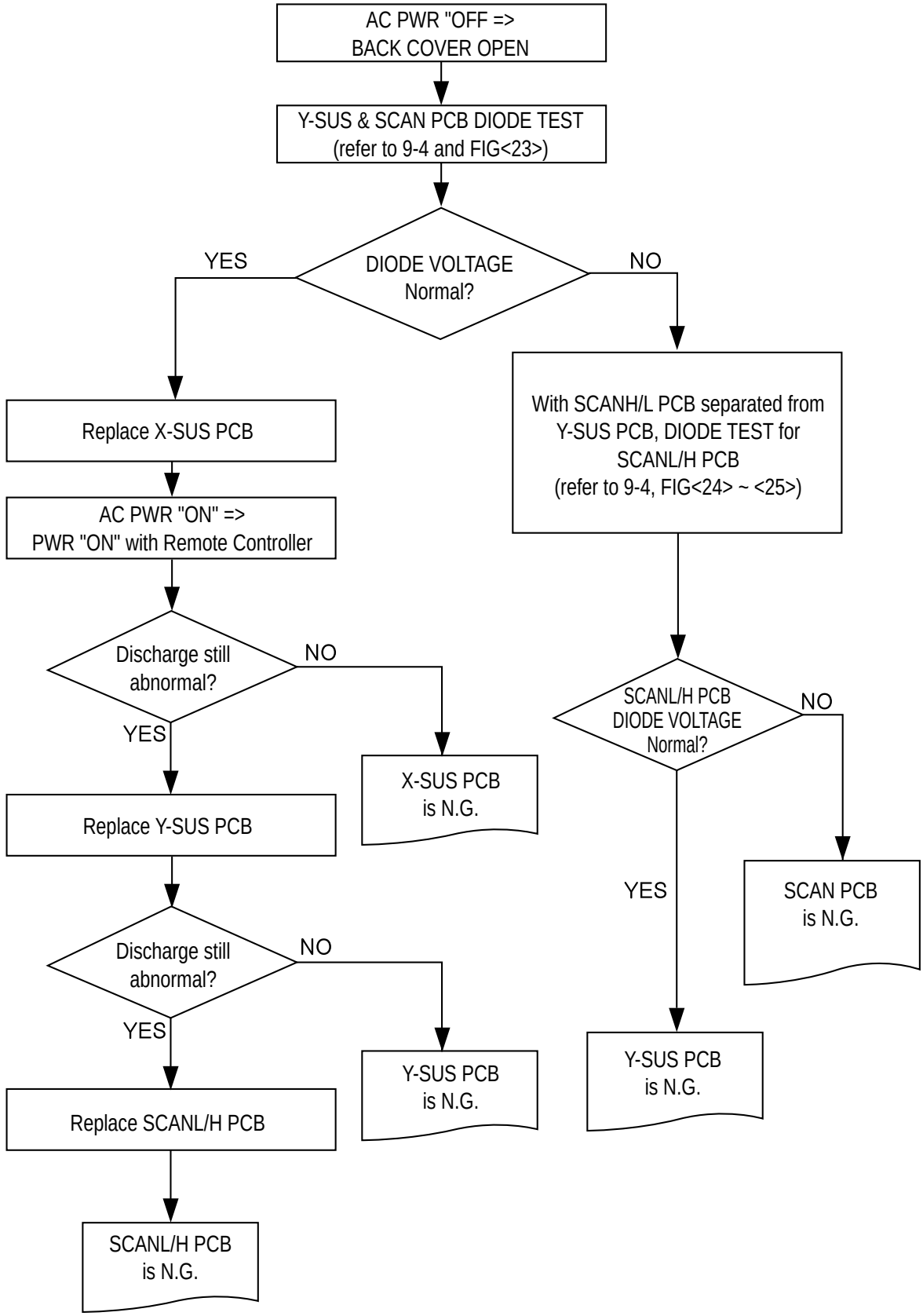
FIG〈10-1〉 Trouble Diagnosis Flow when "SHUT DOWN" occurs


AC PWR "OFF"
POWER PCB's HIGH VOLTAGE SWITCH "OFF" (refer to FIG<21>)
Disconnect X-SUS, Y-SUS 's PWR Connector (P201A, P101A)
AC PWR "ON" => PWR "ON" with Remote Controller
"SHUT DOWN" occur?
YES
NO
AC PWR "OFF"
Disconnect DIGITAL's PWR Connector (P301A)
AC PWR "ON" => PWR "ON" with Remote Controller
"SHUT DOWN" occur?
NO
YES
VIDEO or JACK PCB is N.G.
DIGITAL PCB is N.G.
AC PWR "OFF"
Reconnect only X-SUS's PWR Connector (P201A)
AC PWR "ON" => PWR "ON" with Remote Controller
"SHUT DOWN" occur?
YES
NO
X-SUS PCB is N.G.
Y-SUS or SCAM PCB is N.G.

FIG〈10-2〉 Trouble Diagnosis Flow When LOW VOLTAGE "SHUT DOWN" occurs


AC PWR "OFF"
POWER PCB's HIGH VOLTAGE SWITCH "ON" (refer to FIG<21>)
Disconnect X-SUS, Y-SUS's PWR Connector (P201A, P101A)
AC PWR "ON" => PWR "ON" with Remote Conrtoller
"SHUT DOWN" occur?
YES
NO
POWER PCB is N.G.
AC PWR "OFF"
Reconnect only X-SUS's PWR Connector (P201A)
AC PWR "ON" => PWR "ON" with Remote Controller
"SHUT DOWN" occur?
YES
NO
X-SUS PCB is N.G.
Y-SUS or SCAN PCB is N.G.

FIG〈10-3〉 Trouble Diagnosis Flow when HIGH VOLTAGE "SHUT DOWN" occurs

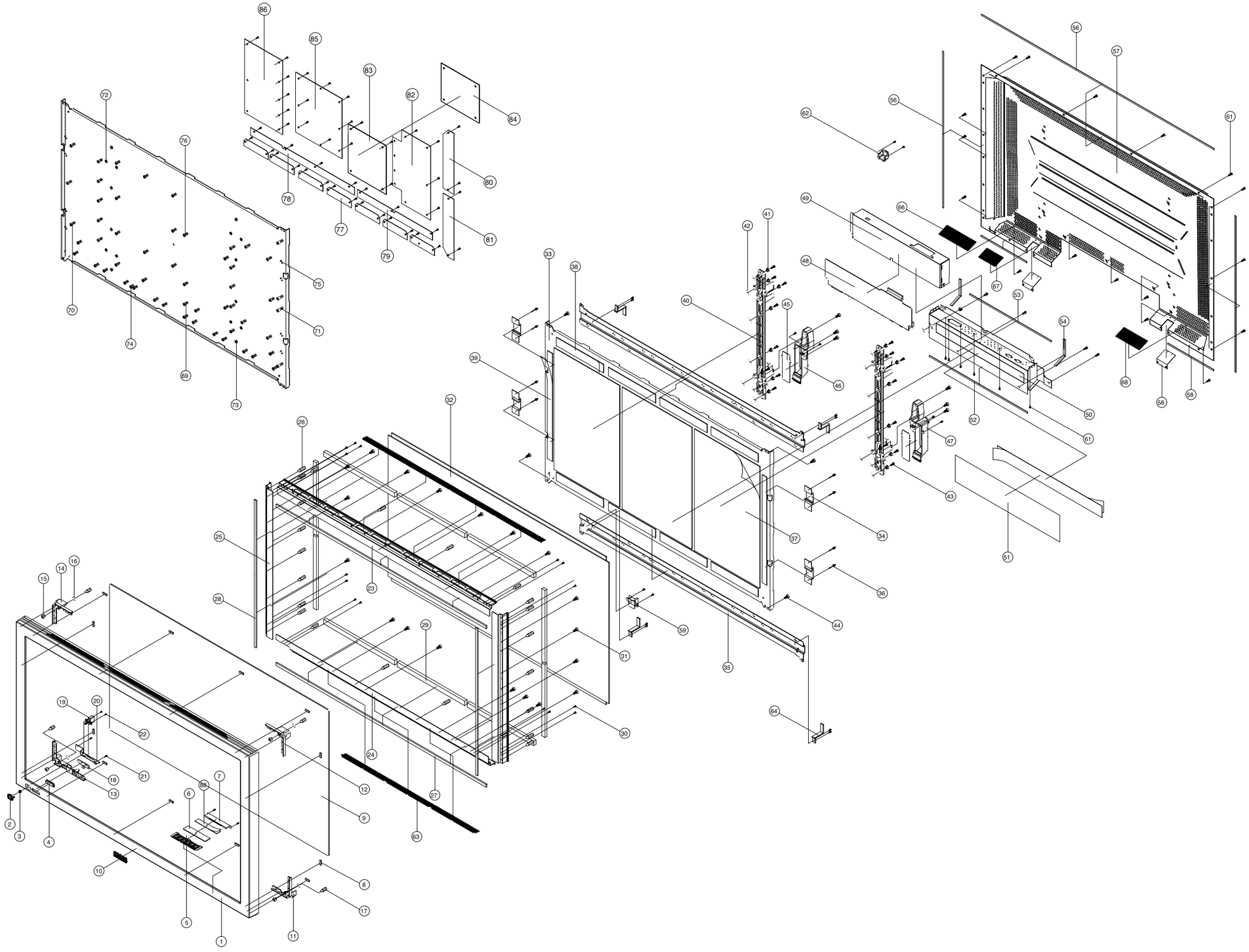


FIG〈10-4〉 Trouble Diagnosis Flow when Discharge(luminescence) is abnormal

11. ASSEMBLY LIST

No.	PCB ASS'Y NAME	ASS'Y CORD	ASS'Y DESCRIPTION
1	VIDEO PCB AS	PEVDMSD035	PCB VIDEO MANUAL AS
2	JAC PCB AS	PEJAMSD035	PCB JACK MANUAL AS
3	DIGITAL PCB AS	PEDGMSD035	PCB DIGITAL MANUAL A
4	X-SUS PCB AS	PEXSMSD035	PCB X-SUS MANUAL AS
5	Y-SUS PCB AS	PEYSMSD035	PCB Y-SUS MANUAL AS
6	SCANH PCB AS	PES1MSD035	PCB SCAN UP AS
7	SCANL PCB AS	PES2MSD035	PCB SCAN-DOWN AS
8	CONN-LEFT PCB AS	PELUMSD035	PCB LEFT MANUAL AS
9	CONN-RIGHT PCB AS	PERUMSD035	PCB RIGHT MANUAL AS
10	MODULE POWER	4950M01110	SP-3000
11	CONNECTOR	4950707008	YMW025-07R+YMT025R+ULW=490
12	CONNECTOR	4950707009	12505WR-07+12505TS=60
13	CONNECTOR	4950711008	12505WR-11+12505TS=60
14	CONNECTOR	4950711007	YMW025-11R+YMT025R=360
15	CONNECTOR	4950712008	12505WR-12+12505TS=80
16	CONNECTOR	4950709013	YMW025-09R+YMT025R+ULW=180
17	CONNECTOR	4950730002	RX30PX160MMX0.5X(0.05X0.3)
18	CONNECTOR	4950750006	KX50PX100MMX0.5X(0.05X0.3
19	CONNECTOR	4950750006	KX50PX100MMX0.5X(0.05X0.3
20	CONNECTOR	4950706024	12505WR-06+12505TS=30
21	CONNECTOR	4950710013	YMH025-10R+YMT025R+ULW=450
22	CONNECTOR	4950705012	YMH025-05R+YMT025R+ULW=440
23	CONNECTOR	4950706025	12505HS-06+12505TS+ULW=750
24	CONNECTOR	4950705013	12505HS-05+12505TS+ULW=920
25	CONNECTOR	4950740001	DF13-40DS-1.25C+DF13-2630SCF+ULW=150
26	CONNECTOR	4950704024	YMH025-04R+YMT025R+ULW=420
27	BRACKET SUPPORT L AS	4951800900	DSP-4280
28	BRACKET SUPPORT R AS	4951801000	DSP-4280
29	BRKT VIDEO	4953401900	SECC T0.6
30	CABLE TIE	4856813100	DA-140
31	CLAMP CORE	4956801200	FTH-3-01
32	CLAMP WIRE	4956800100	STL-J-600-6M-01
33	CLAMP WIRE	4956801100	KSK-3140-RT
34	FILTER EMI	5PZCAT3035	ZCAT3035-1330
35	FILTER EMI	5PZCAT3035	ZCAT3035-1330
36	SCREW MACHINE	7003401012	BIN 4X10 MFZN BK
37	SCREW MACHINE	7063401211	M/C BIN 4X12 MFZN SW
38	SCREW MACHINE	7063401211	M/C BIN 4X12 MFZN SW
39	SCREW MACHINE	7003401012	BIN 4X10 MFZN BK
40	SCREW MACHINE	7008300811	WAS 3X8 MFZN
41	SCREW MACHINE	7063401211	M/C BIN 4X12 MFZN SW
42	SCREW TAPPTITE	7178301011	TT2 WAS 3X10 MFZN
43	SCREW TAPPTITE	7178301011	TT2 WAS 3X10 MFZN
44	SPEC. PLATE	4955400200	PE FILM 98X78
45	SUPPORT CIRCUIT C	4957300400	PCBEHE2-25M-01

12. EXPLODED VIEW



No.	PART CODE	PART NAME	Q'TY	MATERIAL	REMARKS
88		INSULATION BUTTON CH	1		
87		PCB XSA AS	1		
86		PCB X-SUS AS	1		
85		PCB POWER AS	1		
84		PCB VIDEO AS	1		
83		PCB DIGITAL AS	1		
82		PCB Y-SUS AS	1		
81		PCB SCAN LOWER AS	1		
80		PCB SCAN UPPER AS	1		
79		PCB CONNECTION L AS	1		
78		PCB CONNECTION R AS	1		
77		PCB DATA AS	7		
76		GUIDE RIVET	8	SUM32 MFZN	
75		GUIDE POST C	1	SUM32 MFZN	
74		GUIDE POST B	4	SUM32 MFZN	
73		GUIDE POST A	12	SUM32 MFZN	
72		POST PCB D	4	SUM32 MFZN	
71		POST PCB C	4	SUM32 MFZN	
70		POST PCB B	17	SUM32 MFZN	
69		POST PCB A	29	SUM32 MFZN	
68		MESH COVER BACK C	1		
67		MESH COVER BACK B	1		
66		MESH COVER BACK A	1		
65	4957502900	COVER STAND HOLE	2	SECC t0,5	
64	4952600200	HANDLE SET	4	A6061	
63	4955201400	PLATE VENTILATION	7	SECC t0,5	
62	4952102300	COVER POWER	1	FR HIPS BK	
61	7003401012	SCREW MACHINE	26	M BIN 4X10 MFZN BK	
60	7178301012	SCREW TAPTITE	10	TT2 WAS 3X10 MFZN BK	
59	4953401700	BRACKET PROTECTION	1	SECC t1,2	
58		SHIELDRON C3	2	5,0X1,0DX193 Cu+Ni	
57		SHIELDRON C2	1	5,0X1,0DX1021 Cu+Ni	
56		SHIELDRON C1	2	5,0X1,0DX617 Cu+Ni	
55	4952102100	COVER BACK	1	A5052 t1,2	
54		SHIELDRON T3	2	5,0X1,0DX98 Cu+Ni	
53		SHIELDRON T2	1	5,0X1,0DX370 Cu+Ni	
52		SHIELDRON T1	1	5,0X1,0DX436 Cu+Ni	
51		INSULATION TERMINAL	1	PET t0,2	
50	4953600900	PLATE TERMINAL	1	SECC t0,6	
49	4957502700	CASE JACK	1	A5052 t0,5	
48	PEJAMSD01	PCB JACK	1		
47	4953401400	BRACKET SUPPORT L	1	ADC-10	
46	4953401500	BRACKET SUPPORT R	1	ADC-10	
45	4955201300	PLATE SUPPORT	2	SECC t1,0	
44	7063401211	SCREW SPRING MACHINE	10	M BIN 4X12 MFZN	
43		SCREW MACHINE	16	M FLT 4X10 MFZN	
42	4953500800	HOLDER INSULATION B	17	HIPS	
41	4953500700	HOLDER INSULATION A	17	HIPS	
40	4953803600	FRAME SUPPORT	2	ADC-10	
39		TAPE GLASS B	2	VHB4950 t1,1	
38		TAPE GLASS A	8	VHB4950 t1,1	
37	4957900700	THERMAL SHEET	3	9894FR 280X500X1t,1	
36	7541321000	RIVET NAIL	8	PAN 3X40	
35	4953803500	FRAME BACK B	2	A6061 t2,0	
34	4953800900	FRAME BACK A	4	A6061 t1,2	
33	4955201100	PLATE BACK	1	A5052 t2,0	
32	4923002020	PANEL GLASS	1	DSP-4280GM	
31	7178301010	SCREW TAPTITE	12	TT2 WAS 3X10 MFZN	
30	7173401210	SCREW TAPTITE	22	TT2 BIN 4X12 MFZN	
29		CUSHION PANEL	10	t0,2X10,0DX260 (난연 스폰지)	
28		SHIELDRON F2	2	10,0X1,0DX569 Cu+Ni	
27		SHIELDRON F1	2	10,0X1,0DX942 Cu+Ni	
26	4956501600	POST FRAME	25	SUM32 MFZN	
25	4953803100	FRAME SIDE L/R	1	A6061	
24	4953803000	FRAME SIDE DOWN	1	A6061	
23	4953802900	FRAME SIDE TOP	1	A6061	
22	7063350612	SCREW MACHINE	2	M BIN 3X6 MFZN BK	
21	7173300811	SCREW TAPTITE	4	TT2 BIN 3X8 MFZN	
20	4953201000	BRACKET POWER S/W	1	SECC t0,8	
19		POWER S/W	1		
18		PCB LED	1		
17	4923200200	POST CLAMP	4	SUM32 MFZN	
16	4953501500	HOLDER INSULATION D	4	HIPS	
15	4953501400	HOLDER INSULATION C	4	HIPS	
14	4953401000	BRACKET CLAMP UL	1	ADC10	
13	4953401100	BRACKET CLAMP UR	1	ADC10	
12	4953401200	BRACKET CLAMP DL	1	ADC10	
11	4953401300	BRACKET CLAMP DR	1	ADC10	
10	4921300100	BRAND MARK	1	AL	
9	4922800100	FILTER	1	PDF-69H01	
8	7541321000	RUBBER FILTER	8	CR60 t3,0 BK	
7	4957502800	COVER BUTTON PCB	1	SPTH t0,3	
6		PCB CONTROL	1		
5	4954901500	BUTTON CH	1	ABS	
4	4955500900	DECO SENSOR	1	PMMA	
3	4956700300	SPRING POWER S/W	1	SUS304WPB	
2	4954800900	BUTTON POWER	1	HIPS	
1	4952002300	MASK FRONT	1	PC/ABS	

UNITS	mm	DESIGNED BY	CHECKED BY	INSPECTED BY	APPROVED BY
		WOO JUNG WOOK			
SCALE	N/S	[ApvDate]			

PART NAME

EXPLODED VIEW

1 OF 1

DIGITAL TV RESEARCH CENTER

DAEWOO ELECTRONICS CO., LTD.

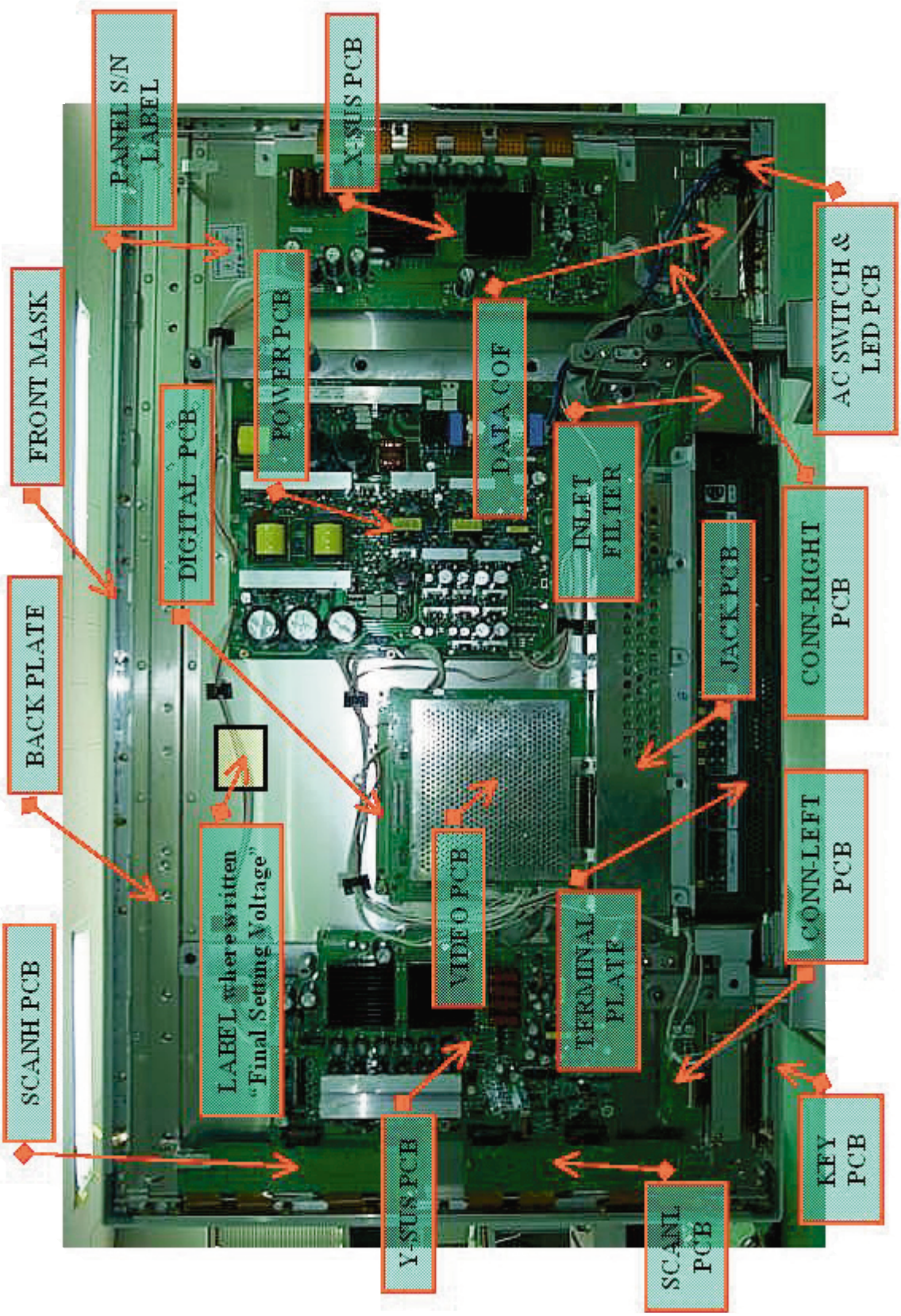
MODEL NAME: DSP-4280GM

REFERENCE

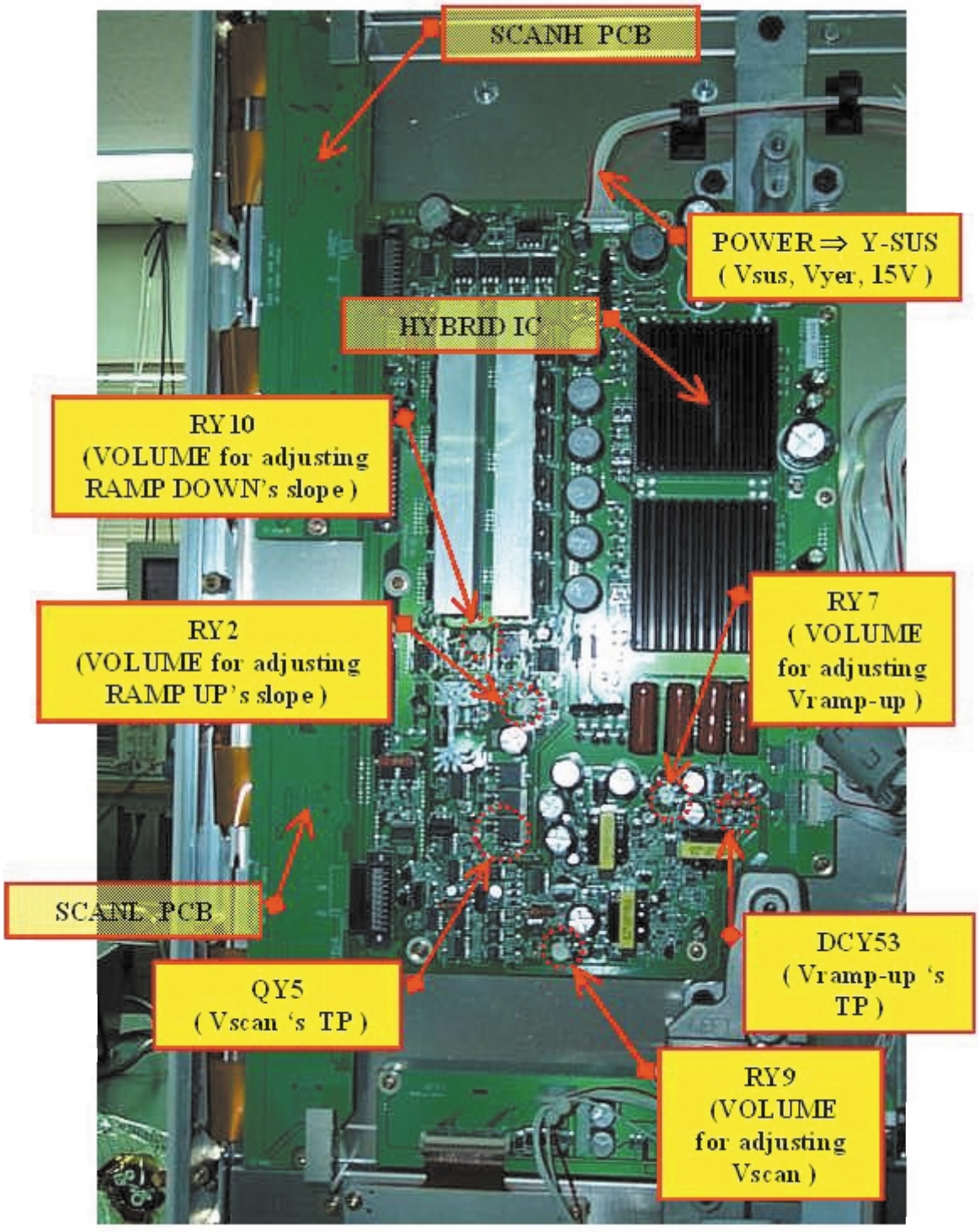
D/T

49500033

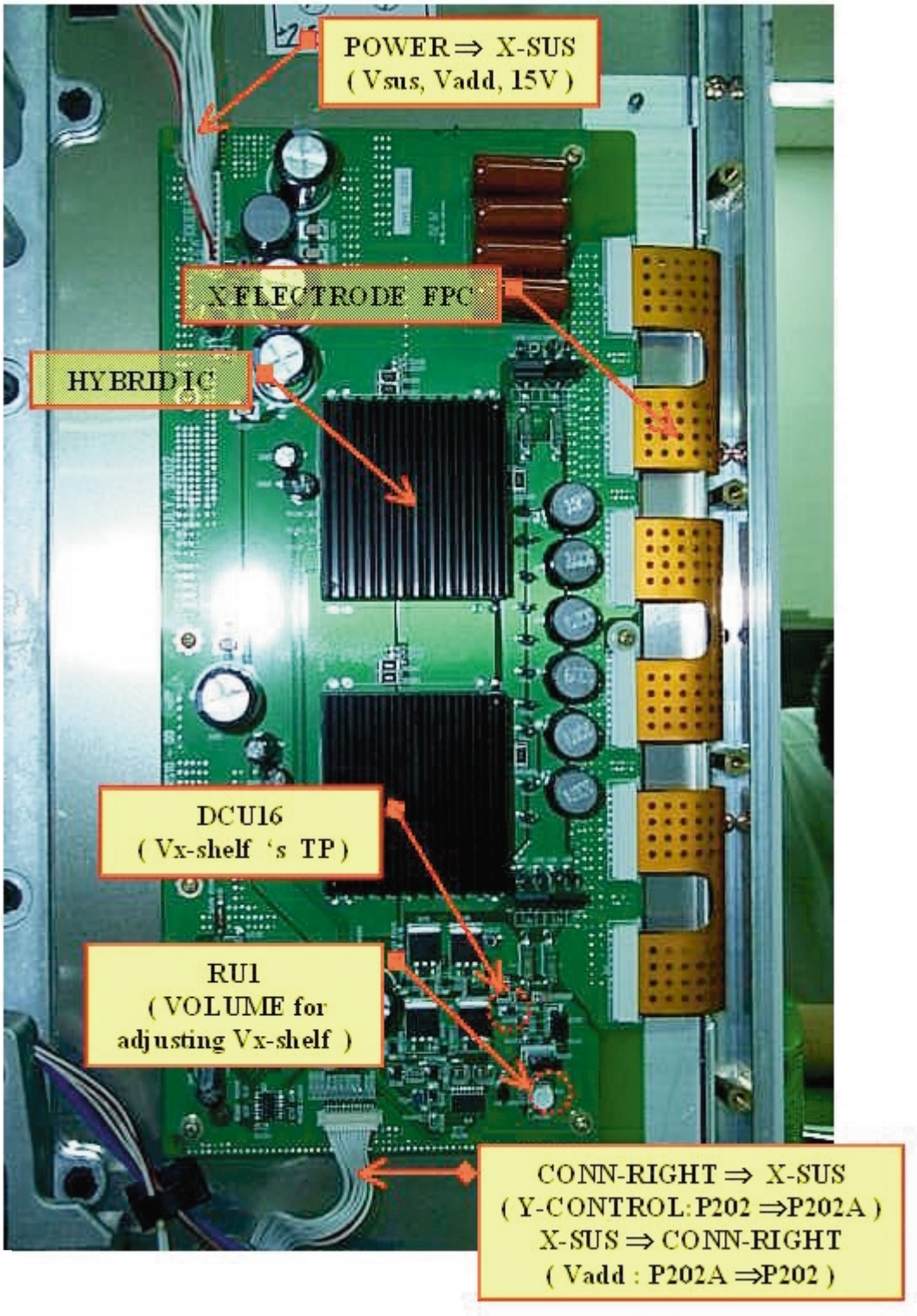
13. FIGURE COLLECTION



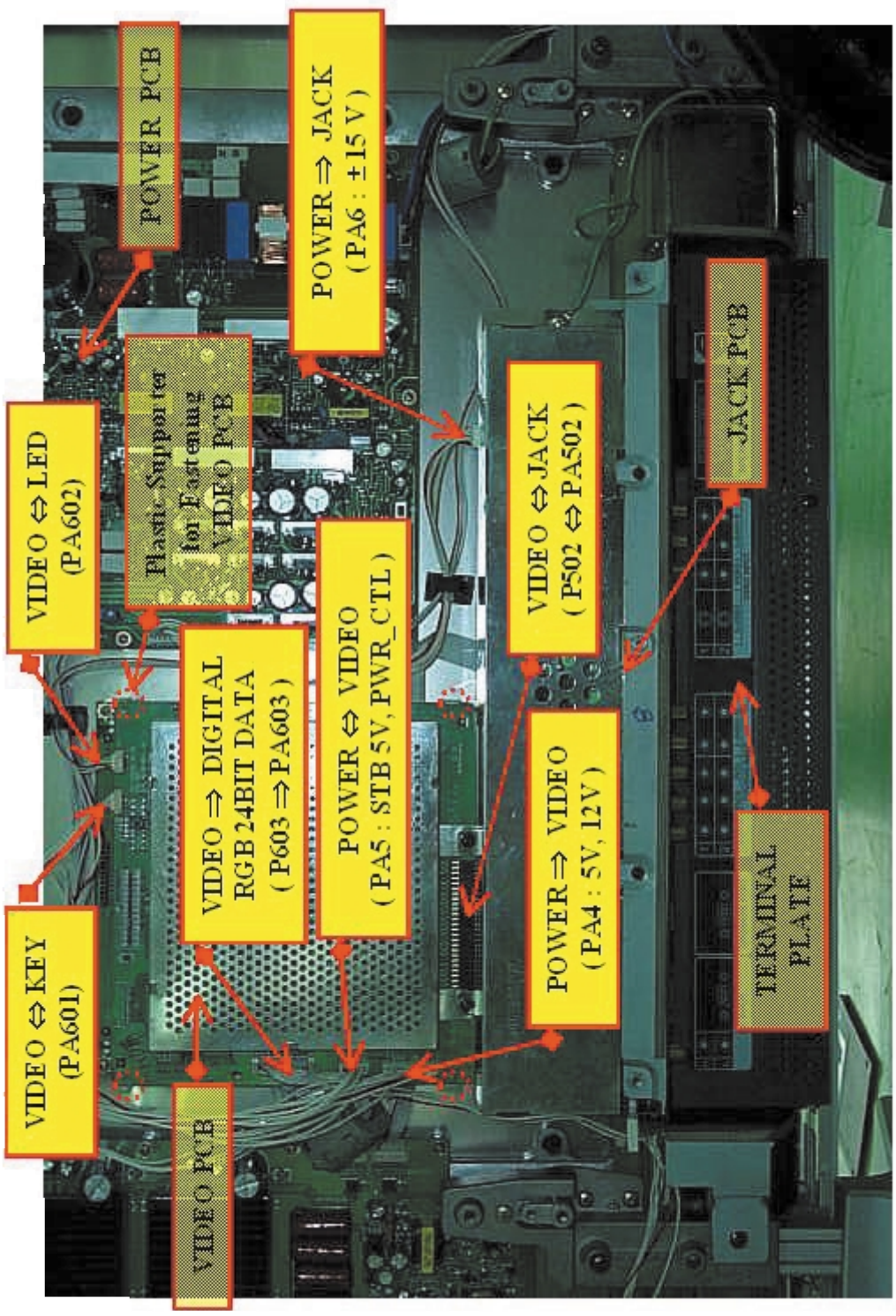
FIG<1> TOTAL



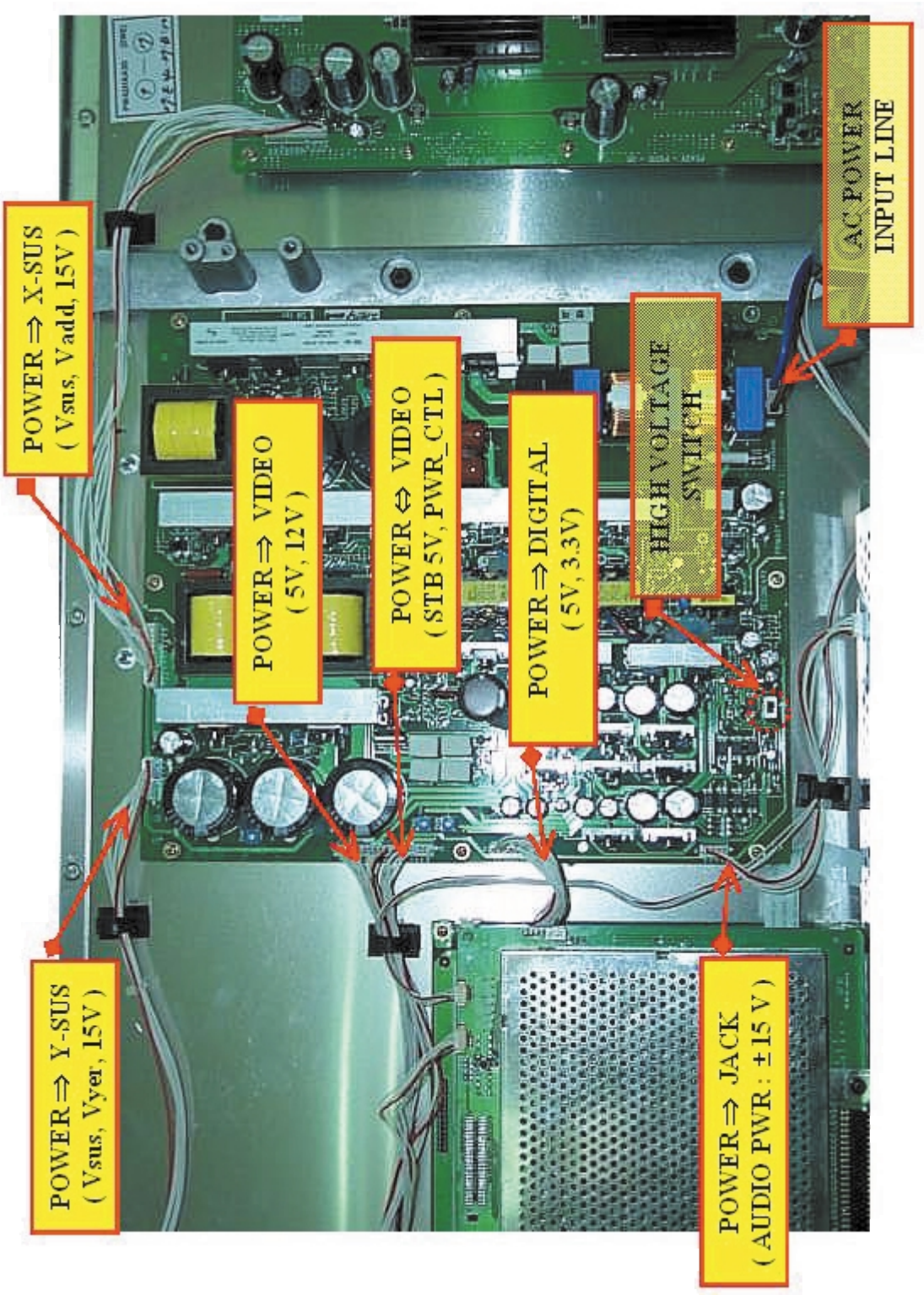
FIG<2> Y-SUS & SCAN


POWER ⇒ X-SUS
(Vsus, Vadd, 15V)
XELECTRODE FPC
HYBRID IC
DCU16
(Vx-shelf 's TP)
RU1
(VOLUME for
adjusting Vx-shelf)
CONN-RIGHT ⇒ X-SUS
(Y-CONTROL:P202 ⇒P202A)
X-SUS ⇒ CONN-RIGHT
(Vadd : P202A ⇒P202)

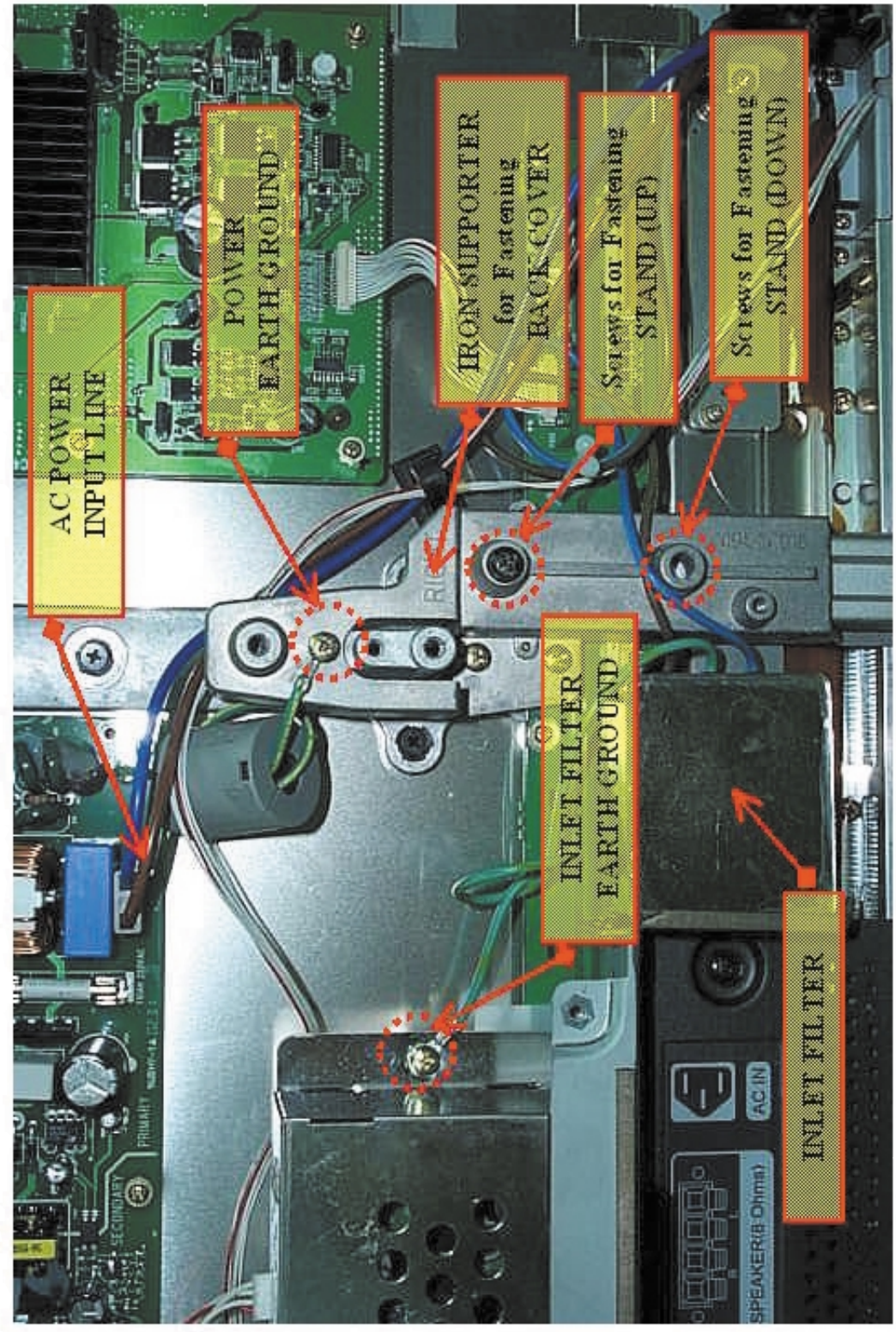
FIG<3> X-SUS



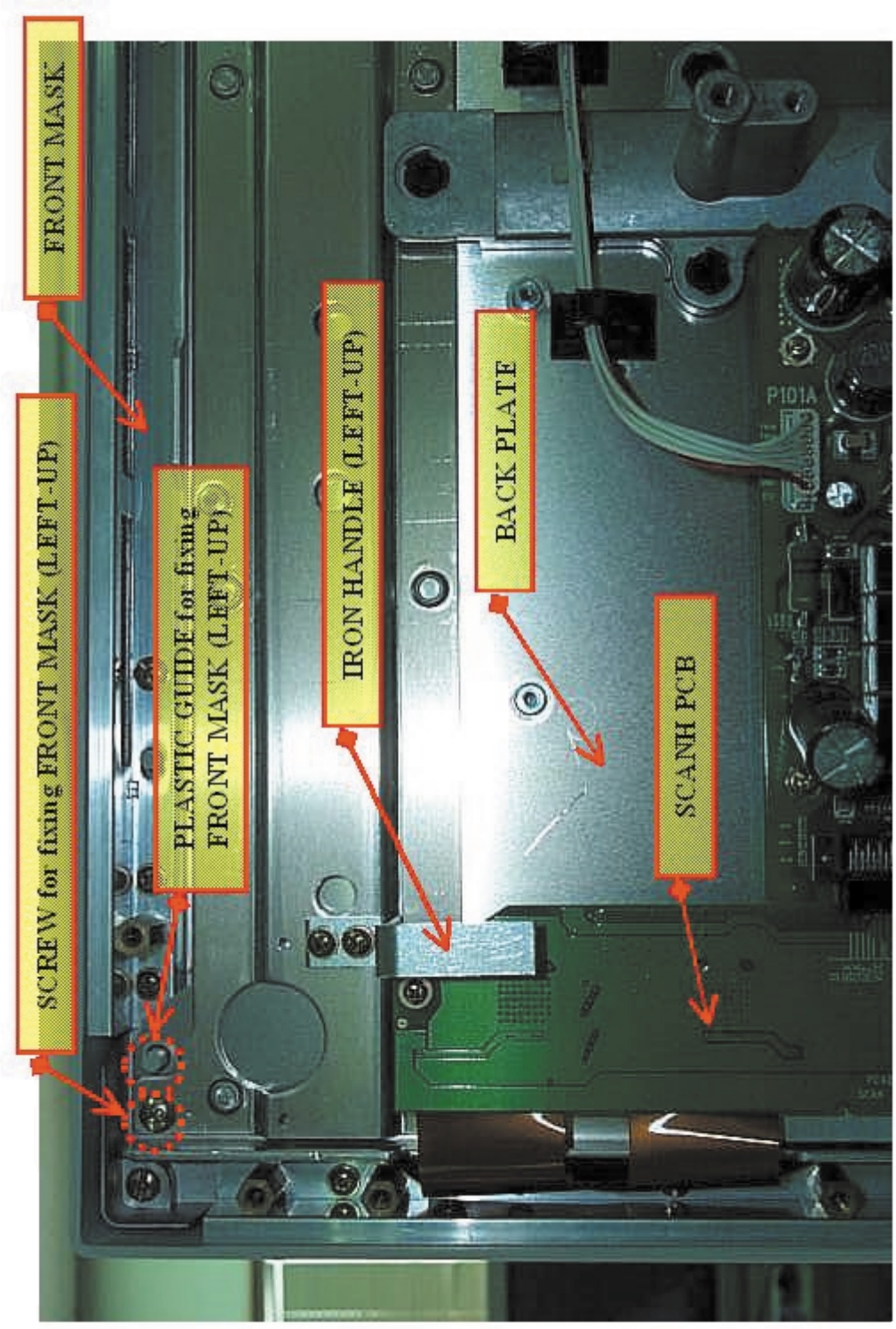
FIG<4> VIDEO & JACK


POWER ⇒ X-SUS
(Vsus, Vadd, 15V)
POWER ⇒ VIDEO
(5V, 12V)
POWER ⇔ VIDEO
(STB 5V, PWR_CTL)
POWER ⇒ DIGITAL
(5V, 3.3V)
HIGH VOLTAGE
SWITCH
AC POWER
INPUT LINE
POWER ⇒ Y-SUS
(Vsus, Vyer, 15V)
POWER ⇒ JACK
(AUDIO PWR : ± 15 V)

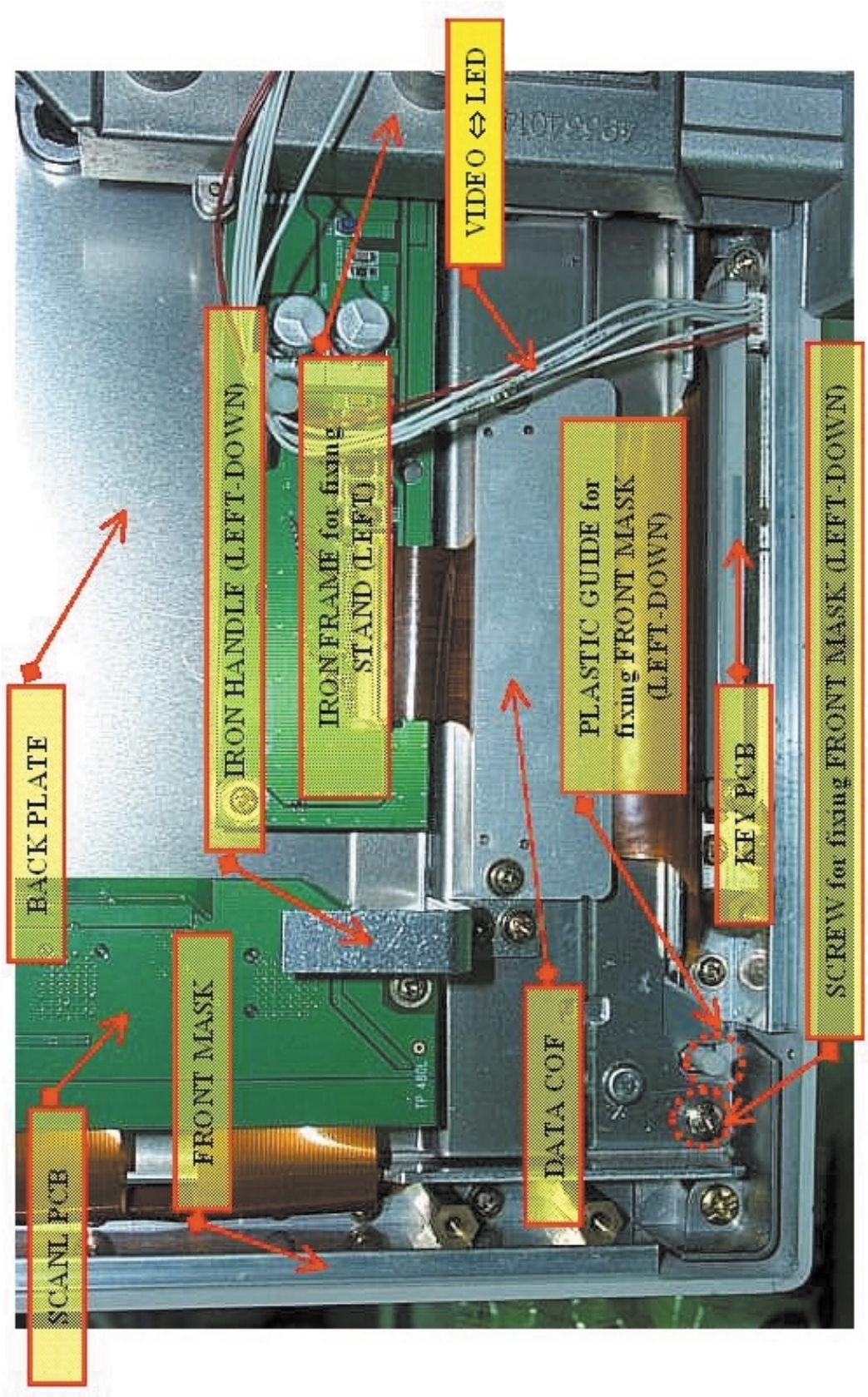
FIG<5> POWER


AC POWER
INPUT LINE
POWER
EARTH GROUND
IRON SUPPORTER
for Fastening
BACK COVER
Screws for Fastening
STAND (UP)
Screws for Fastening
STAND (DOWN)
INLET FILTER
EARTH GROUND
INLET FILTER
AC IN
SPEAKER(8 Ohms)
SECONDARY
PRIMARY

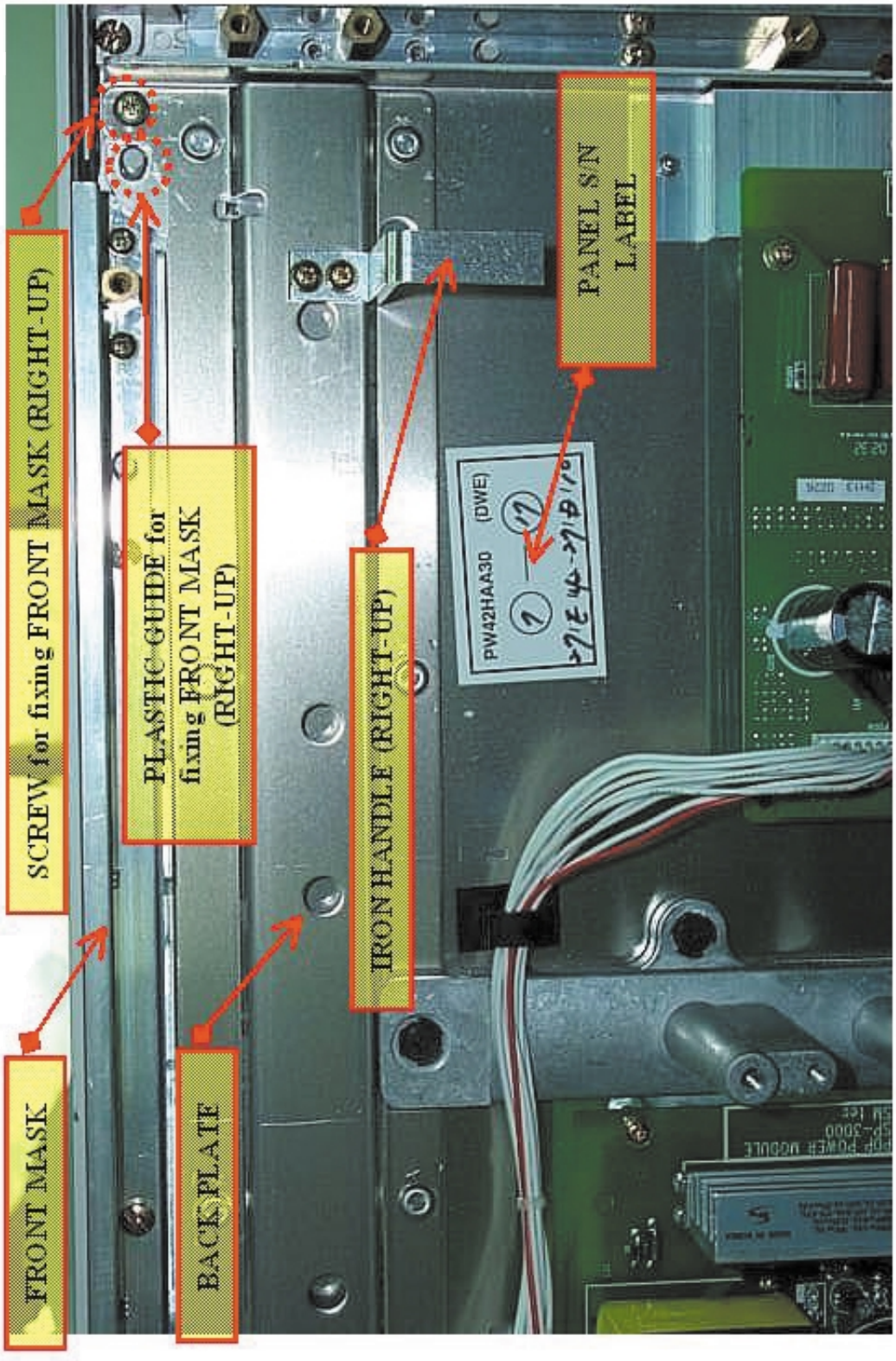
FIG<6> INLET


FRONT MASK
SCREW for fixing FRONT MASK (LEFT-UP)
PLASTIC GUIDE for fixing FRONT MASK (LEFT-UP)
IRON HANDLE (LEFT-UP)
BACK PLATE
SCANH PCB
P101A

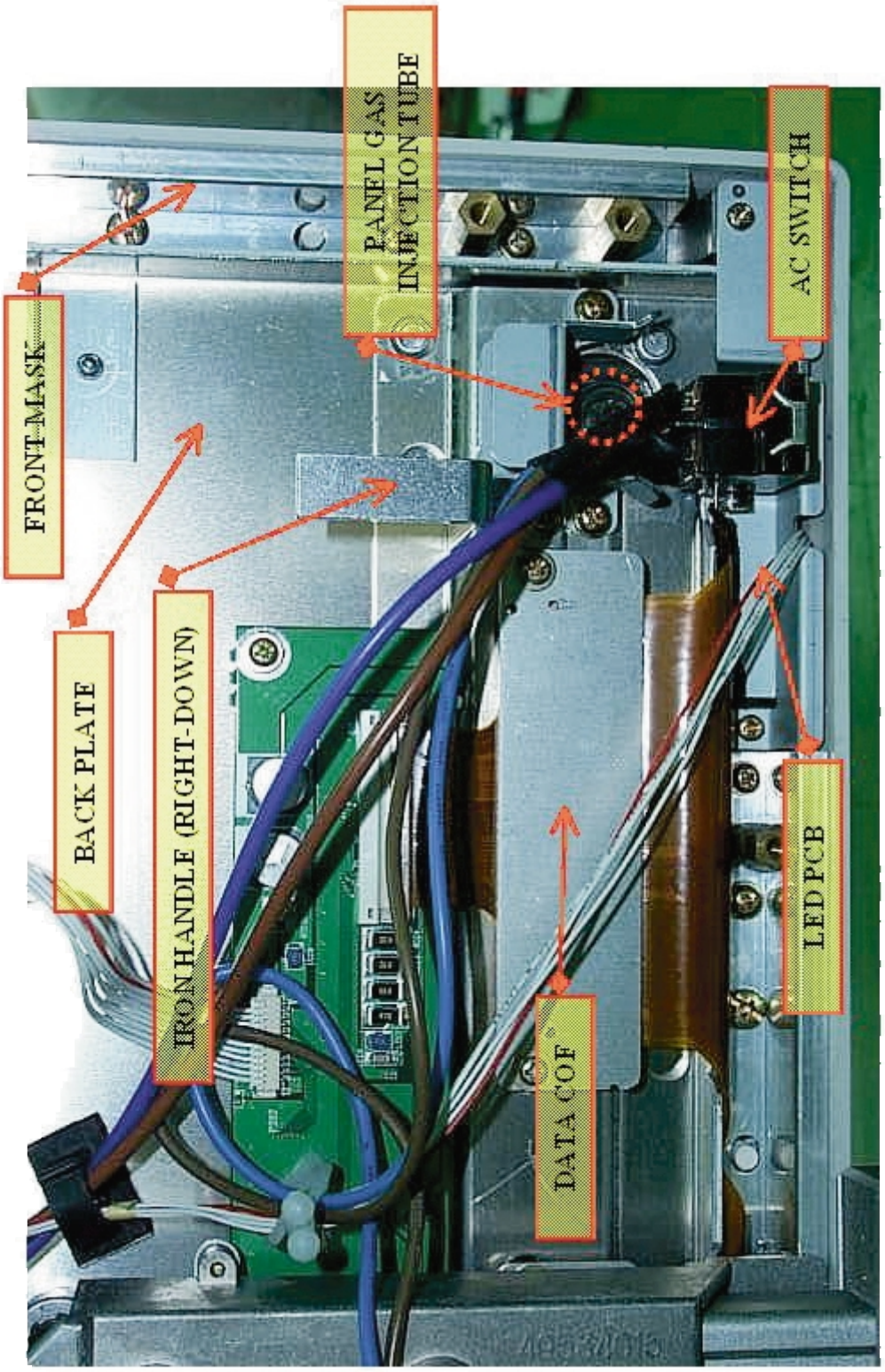
FIG<7> LEFT-UP



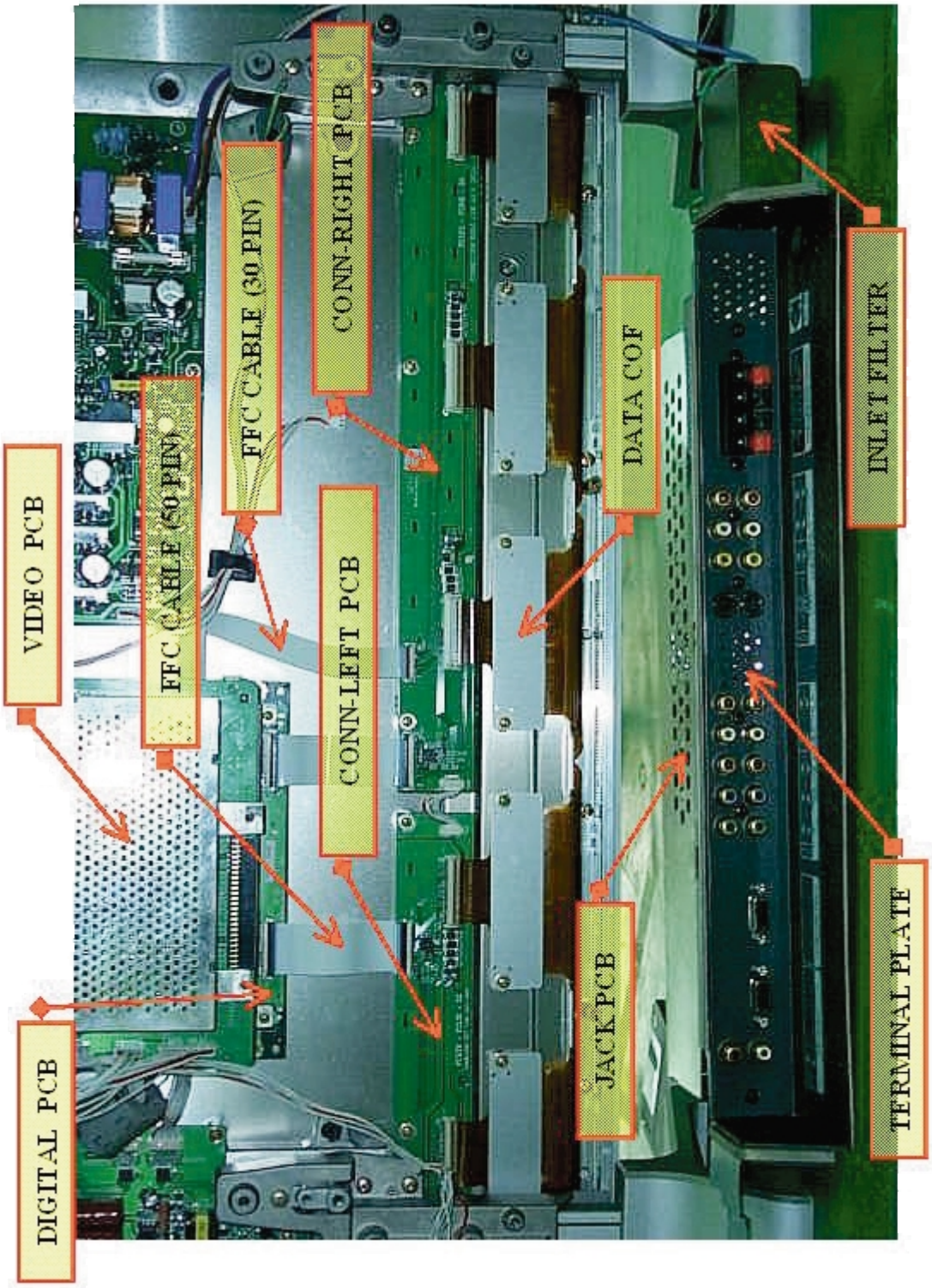
FIG<8> LEFT-DOWN



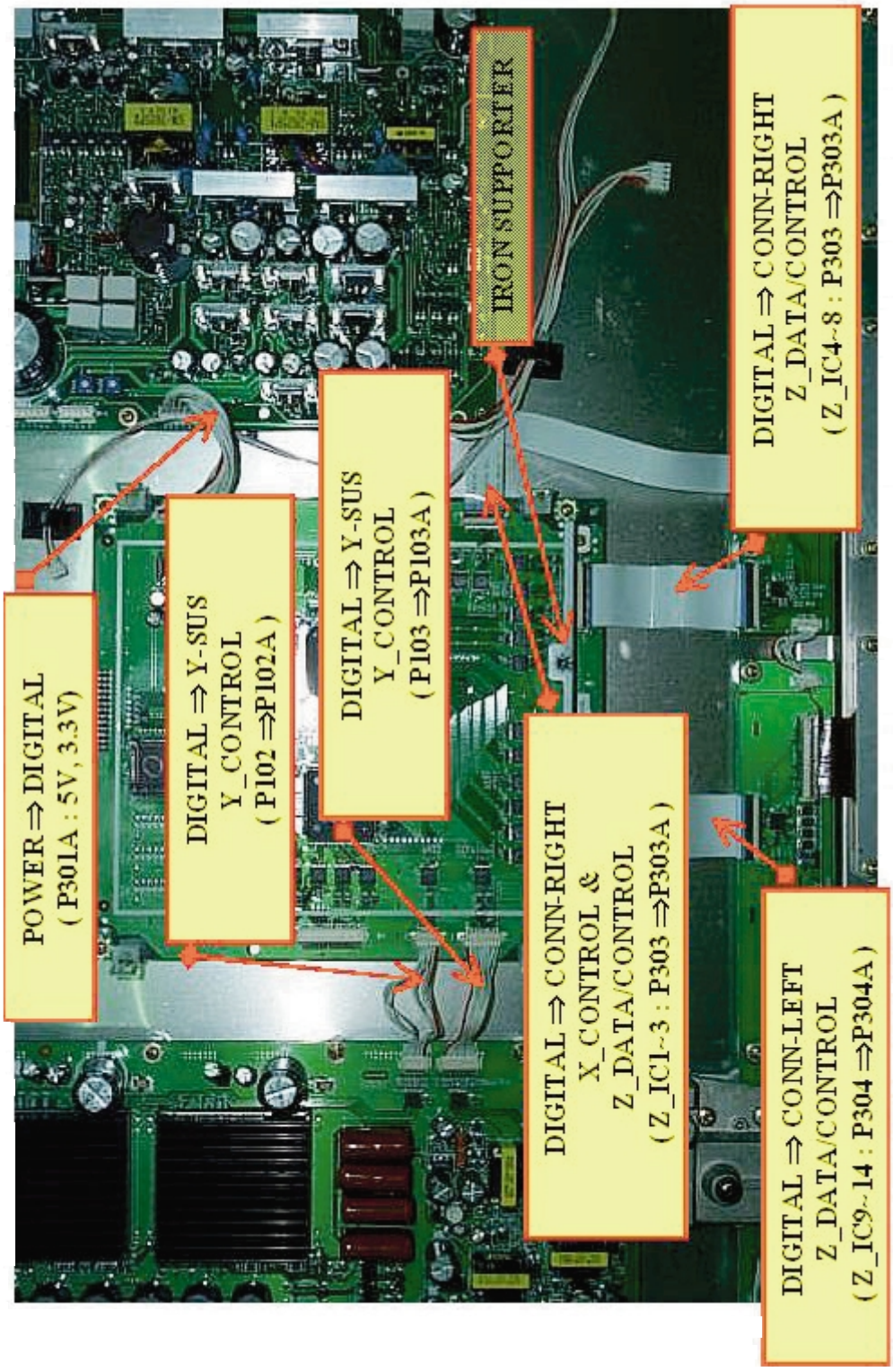
FIG<9> RIGHT-UP



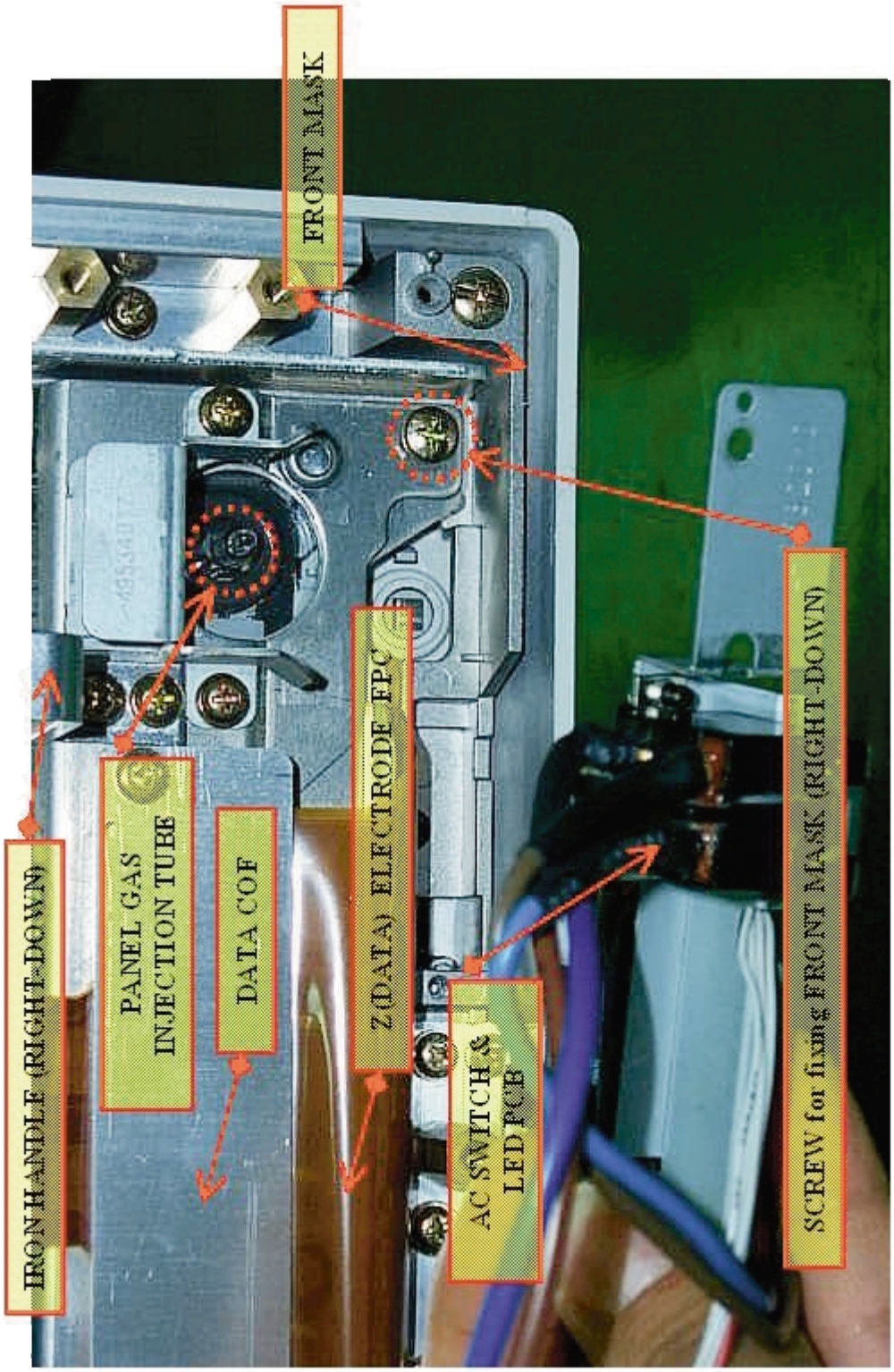
FIG<10> RIGHT-DOWN



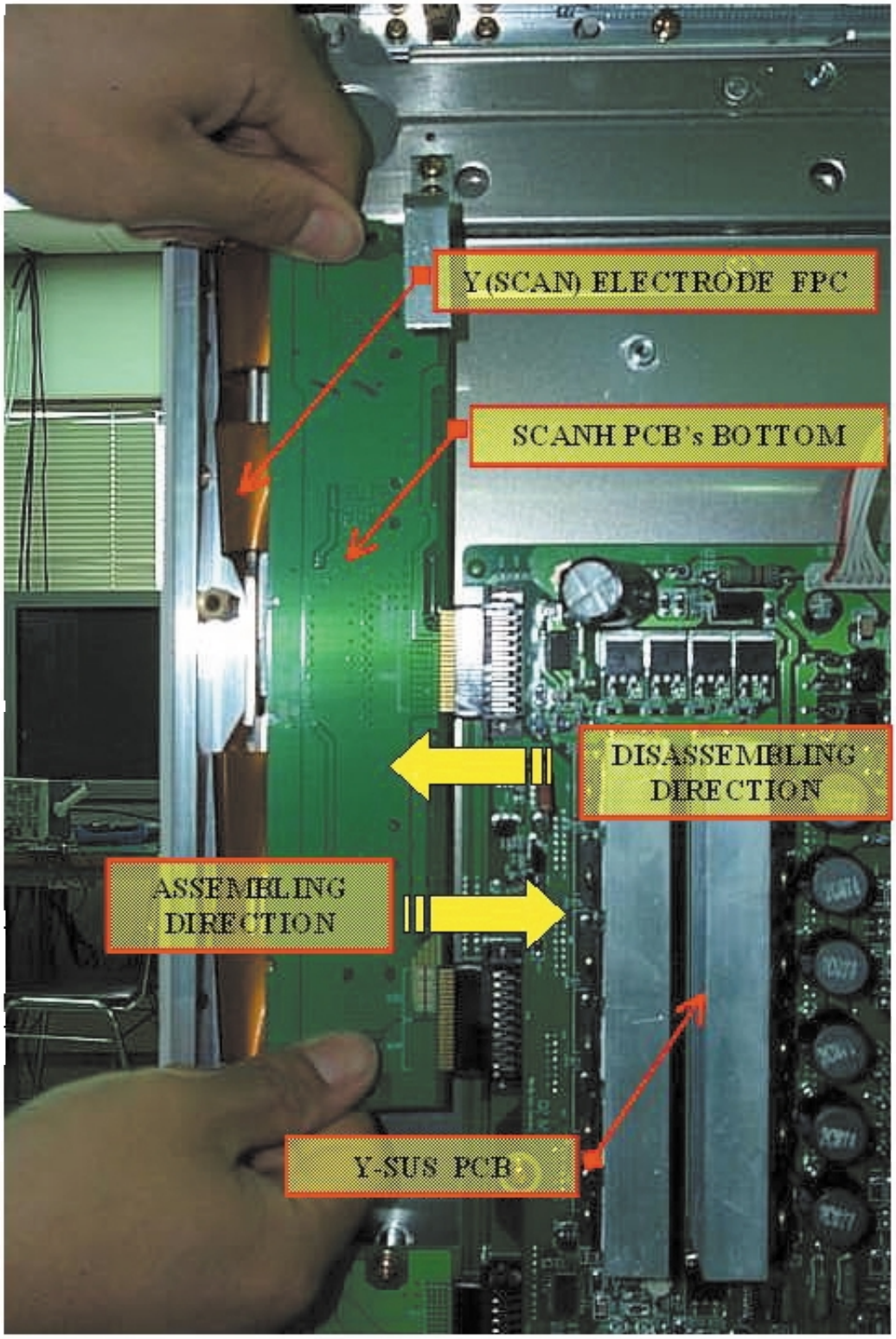
FIG<11> WITHOUT JACK



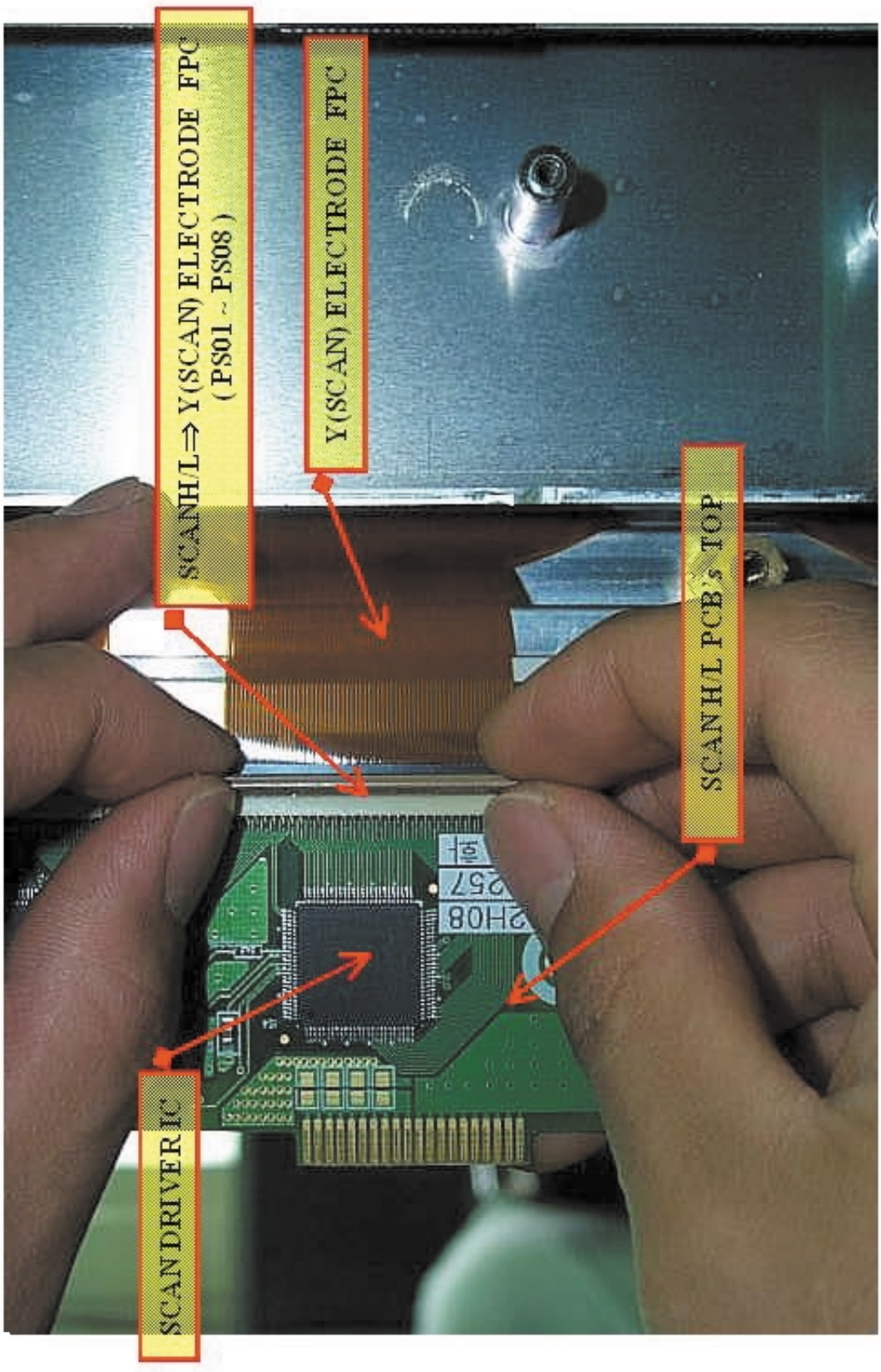
FIG<12> DIGITAL



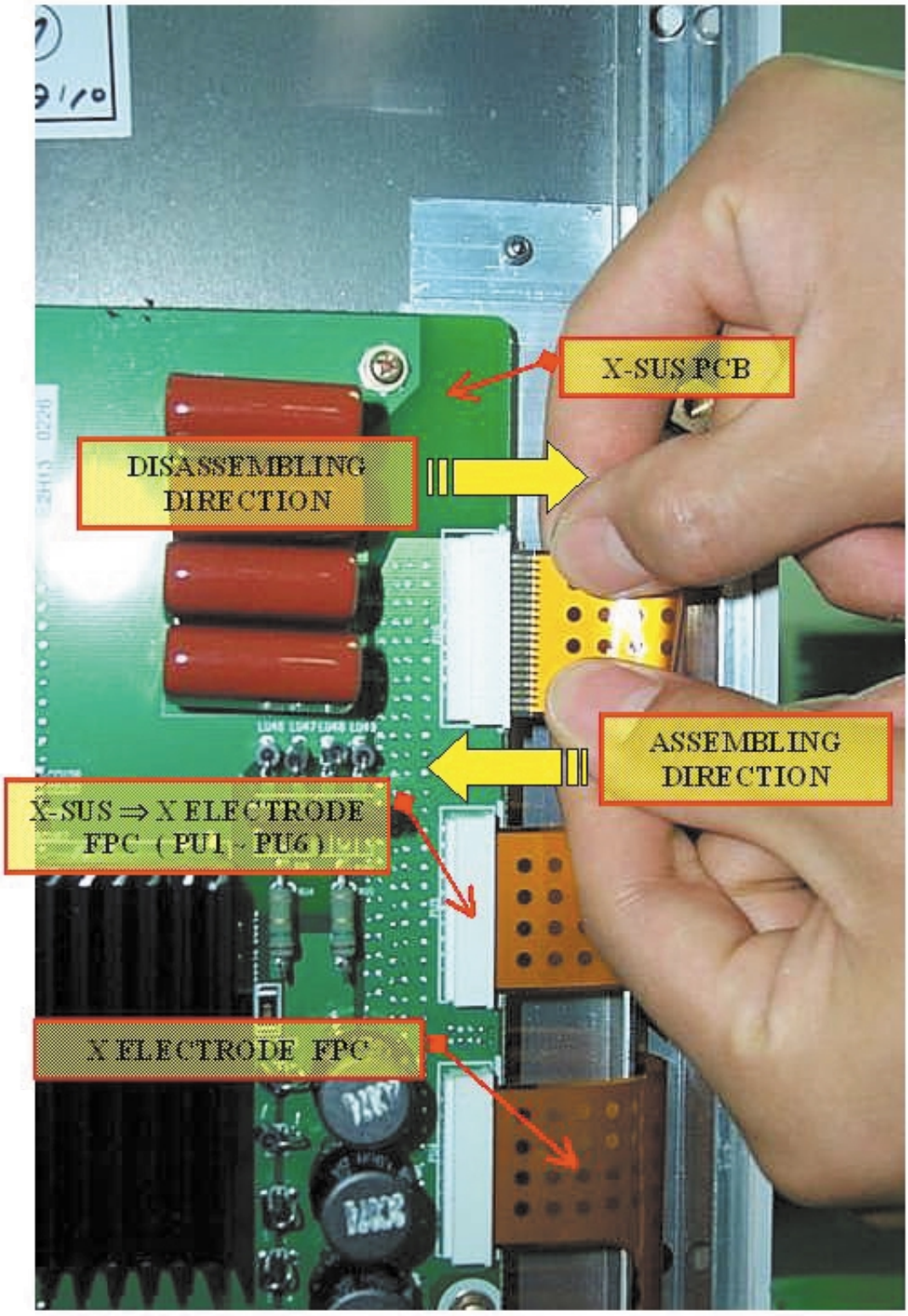
FIG<13> AC SWITCH ASSEMBLY



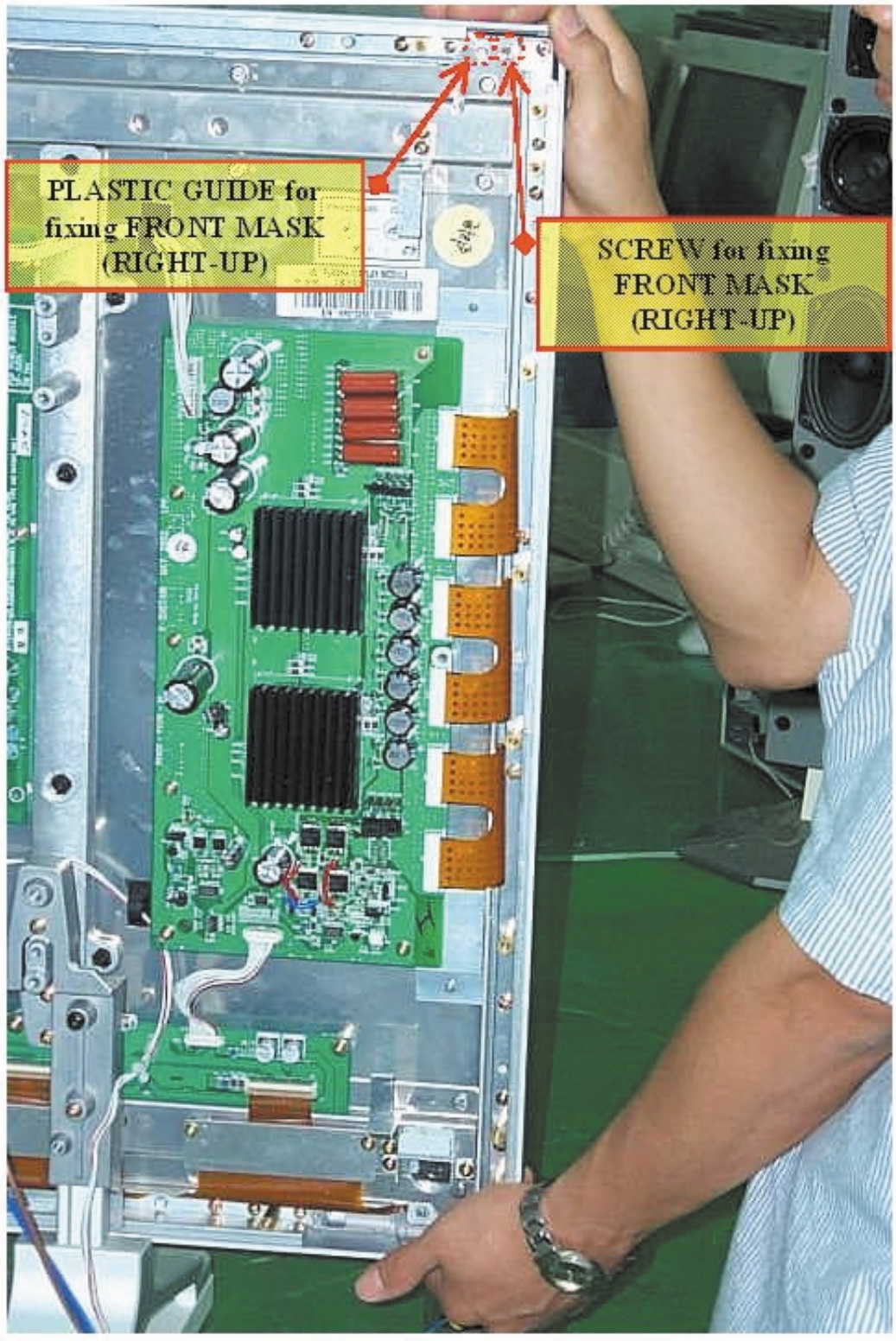
FIG<14> SCAN-ASSEMBLY 1



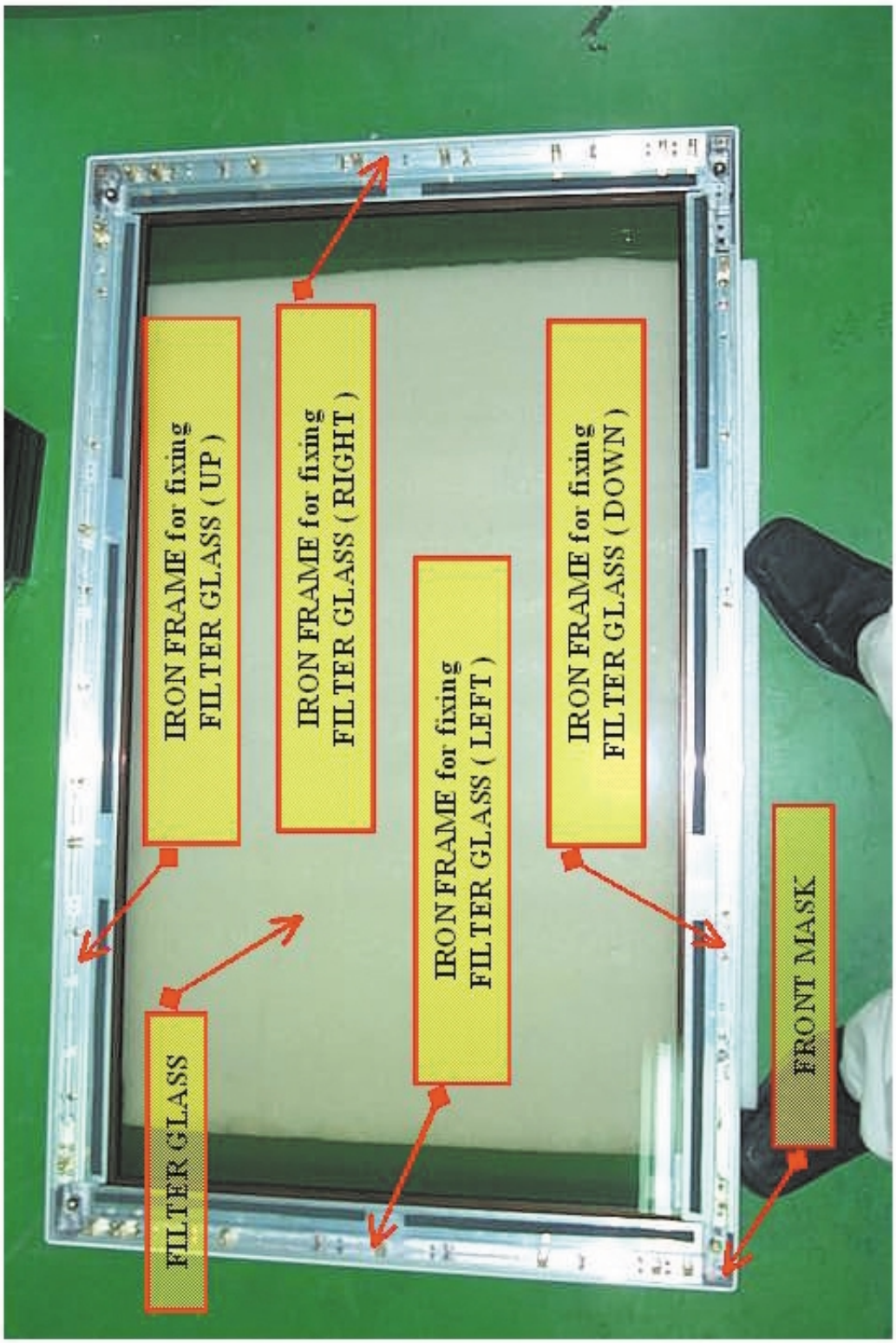
FIG<15> SCAN-ASSEMBLY 2



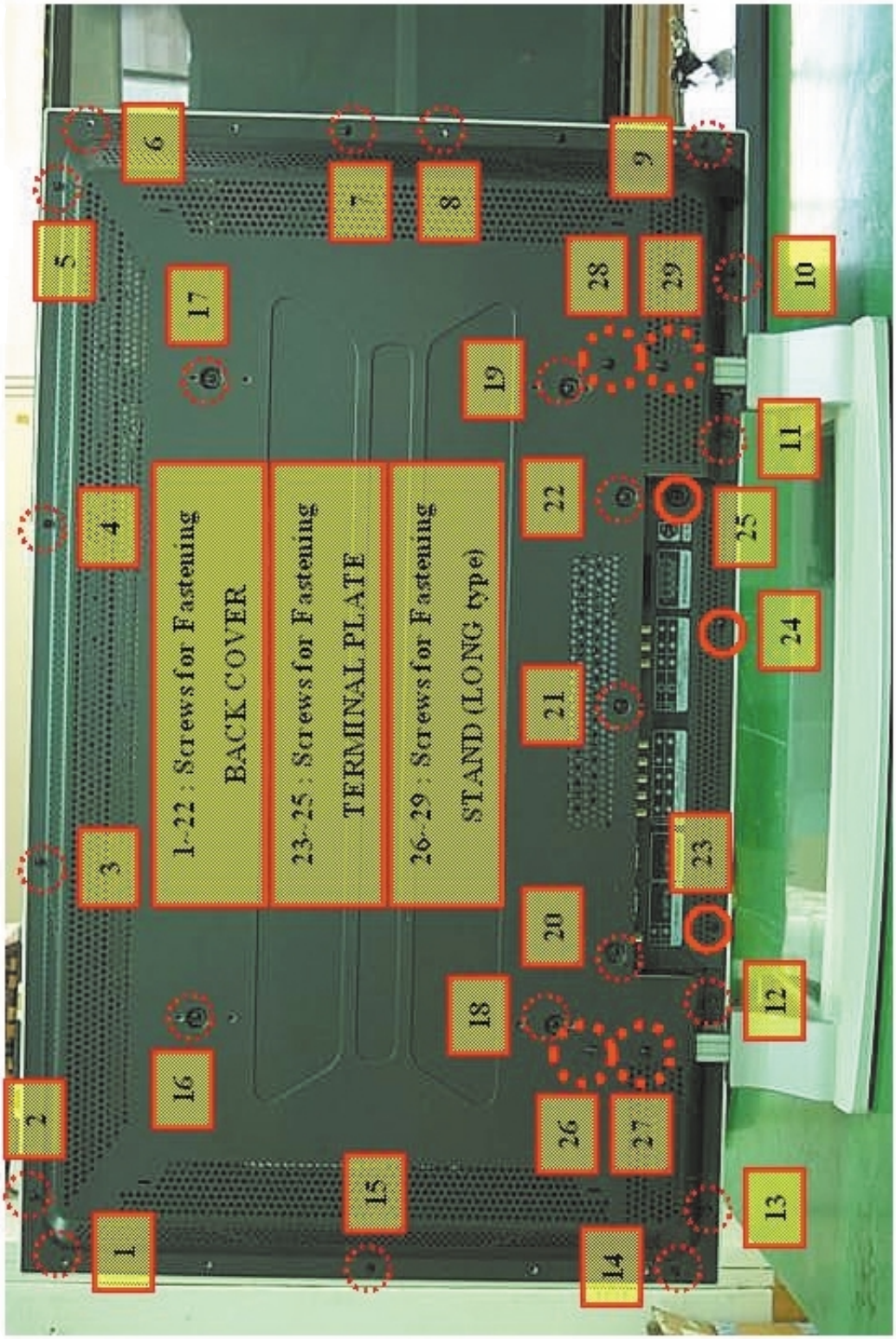
FIG<16> X-SUS_ASSEMBLY



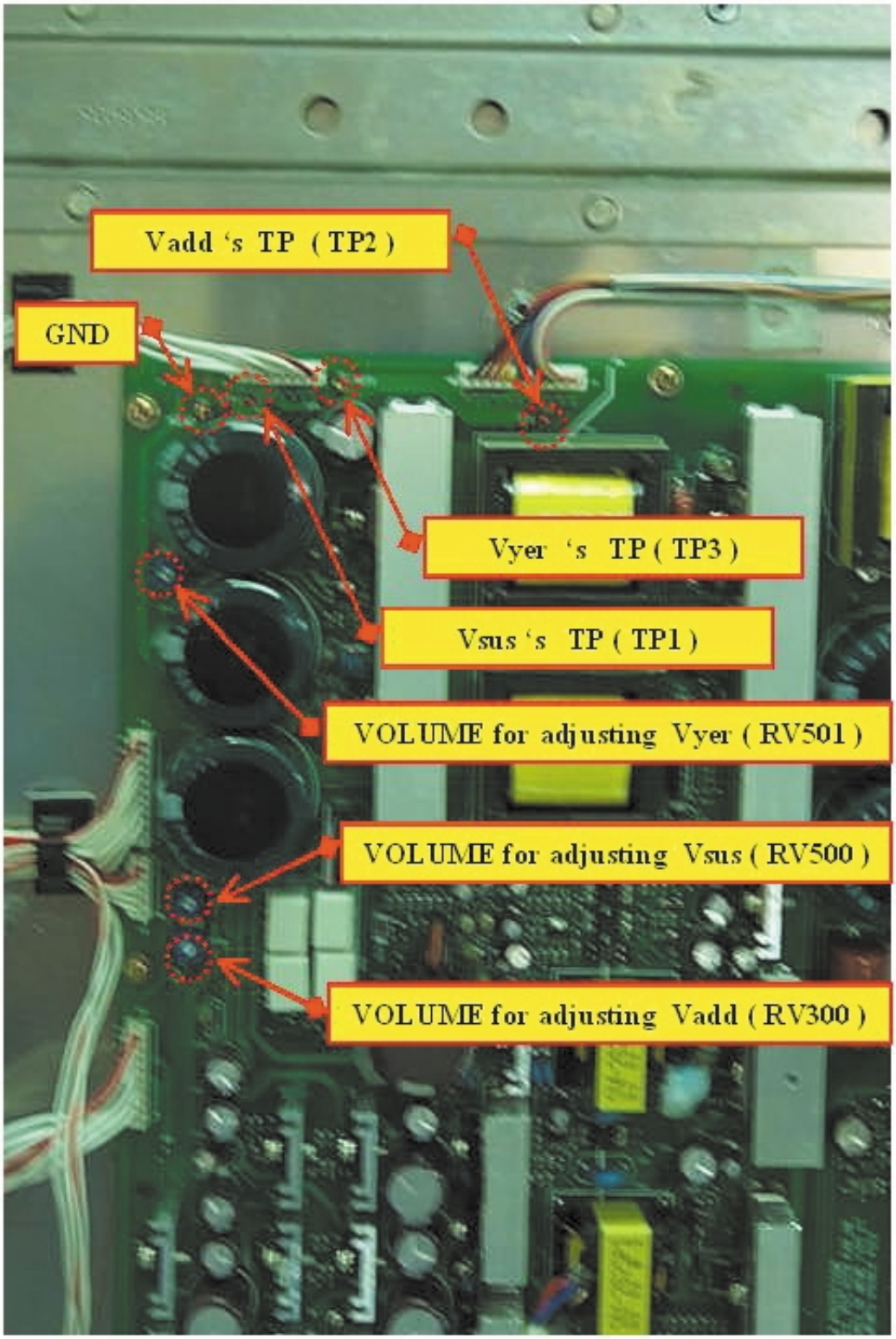
FIG<17> FRONT MASK_ASSEMBLY


IRON FRAME for fixing
FILTER GLASS (UP)
IRON FRAME for fixing
FILTER GLASS (RIGHT)
IRON FRAME for fixing
FILTER GLASS (LEFT)
IRON FRAME for fixing
FILTER GLASS (DOWN)
FILTER GLASS
FRONT MASK

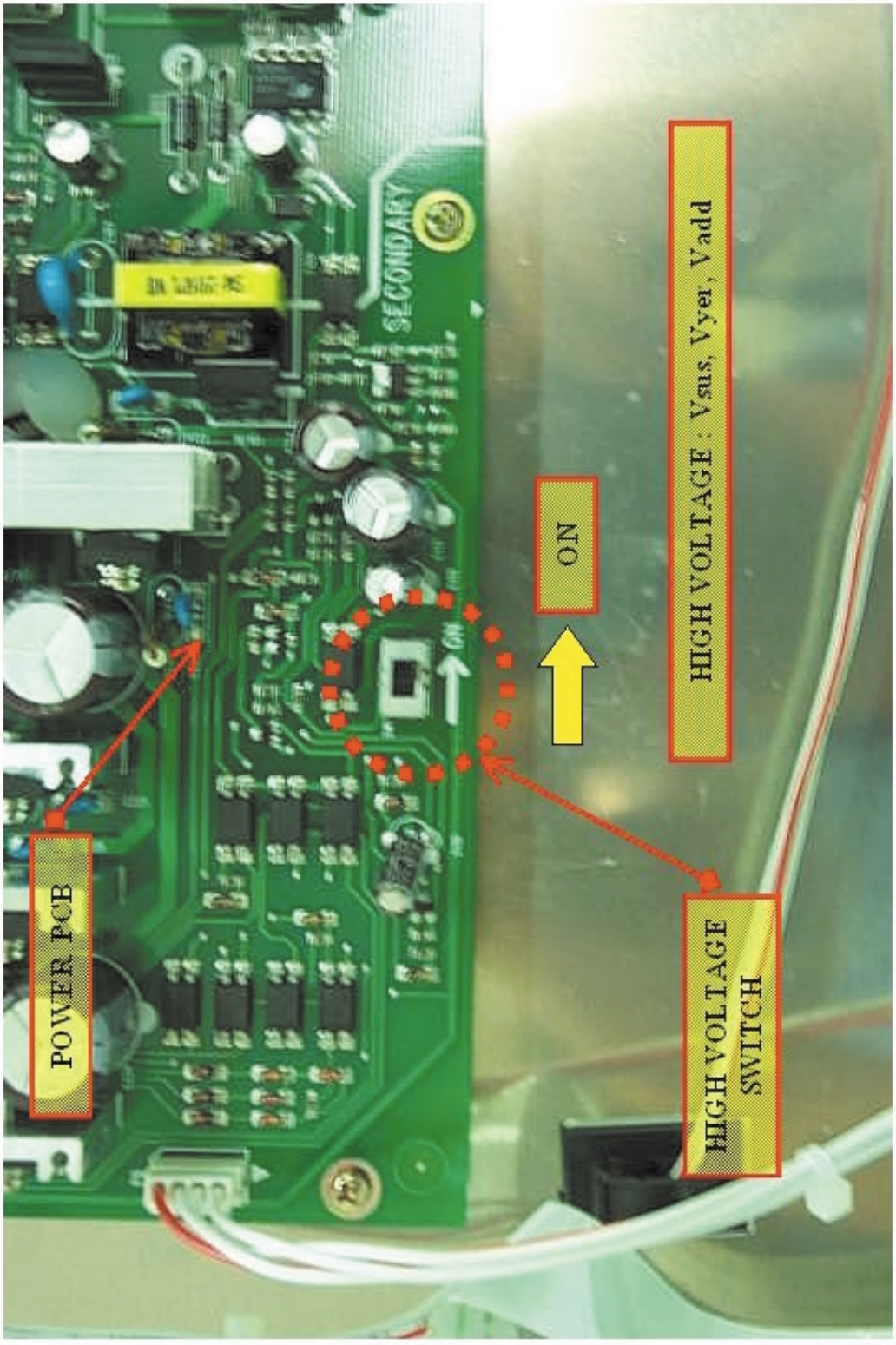
FIG<18> FRONT MASK_INSIDE



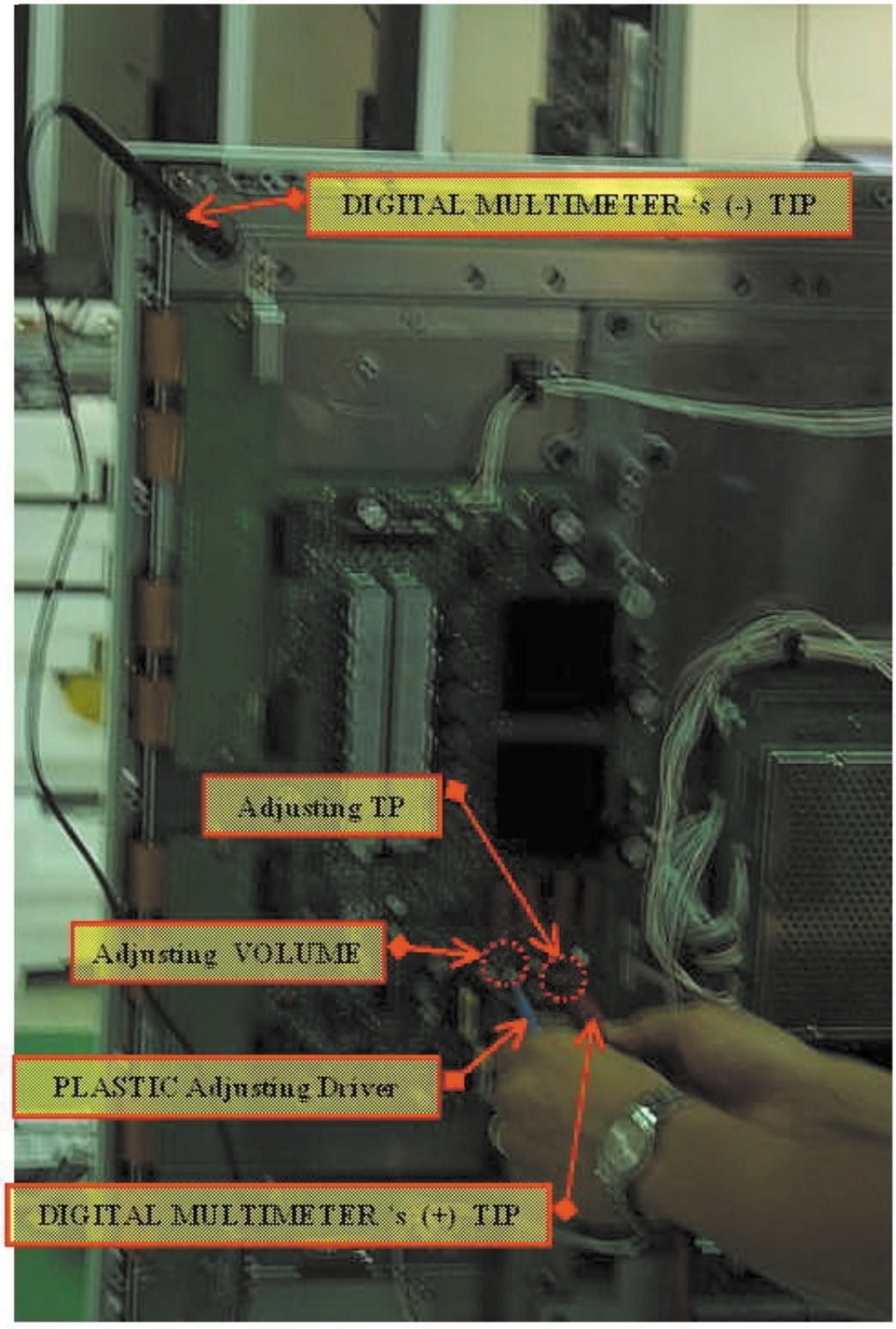
FIG<19> BACK COVER


Vadd 's TP (TP2)
GND
Vyer 's TP (TP3)
Vsus 's TP (TP1)
VOLUME for adjusting Vyer (RV501)
VOLUME for adjusting Vsus (RV500)
VOLUME for adjusting Vadd (RV300)

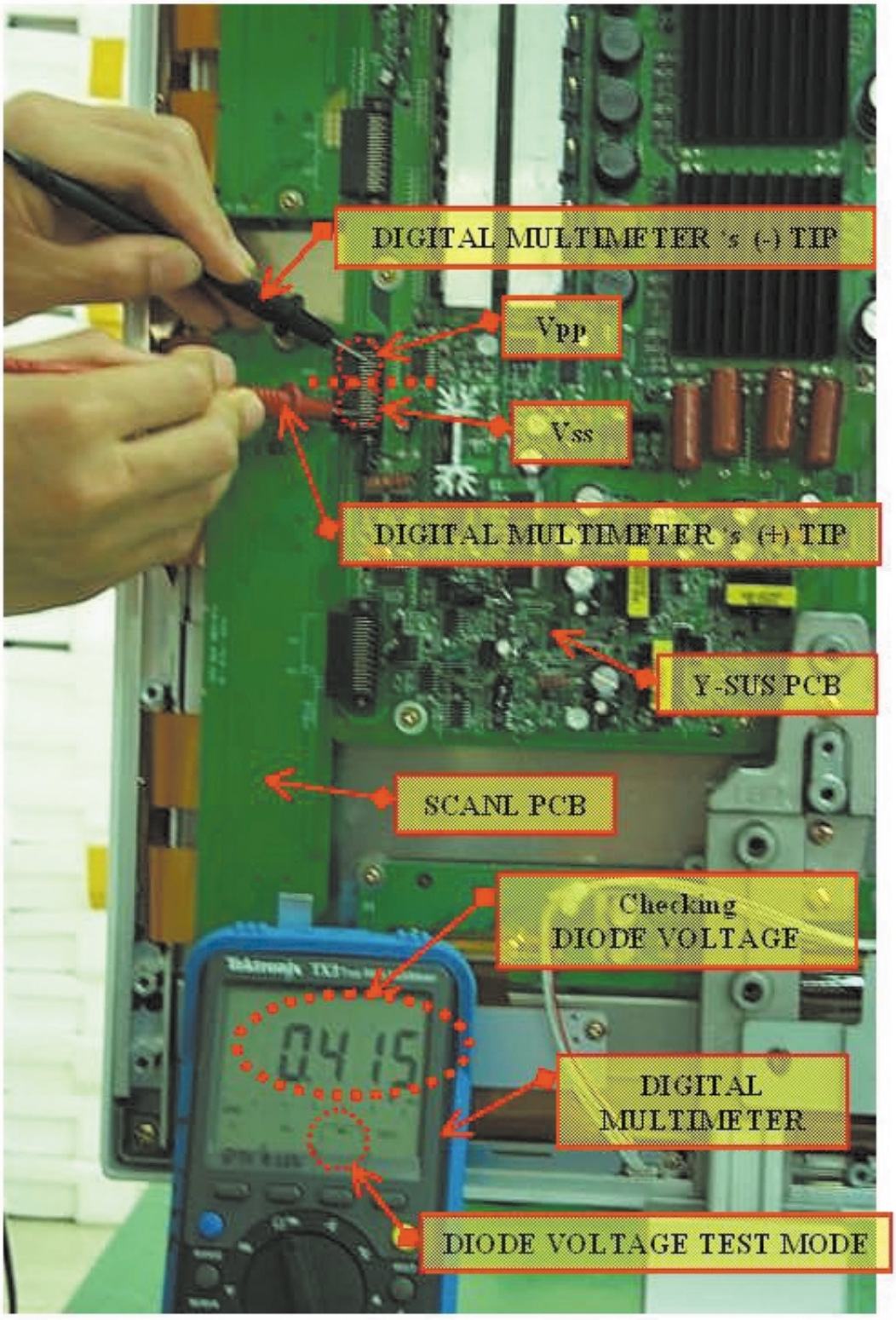
FIG<20> POWER ADJUSTING POINTS



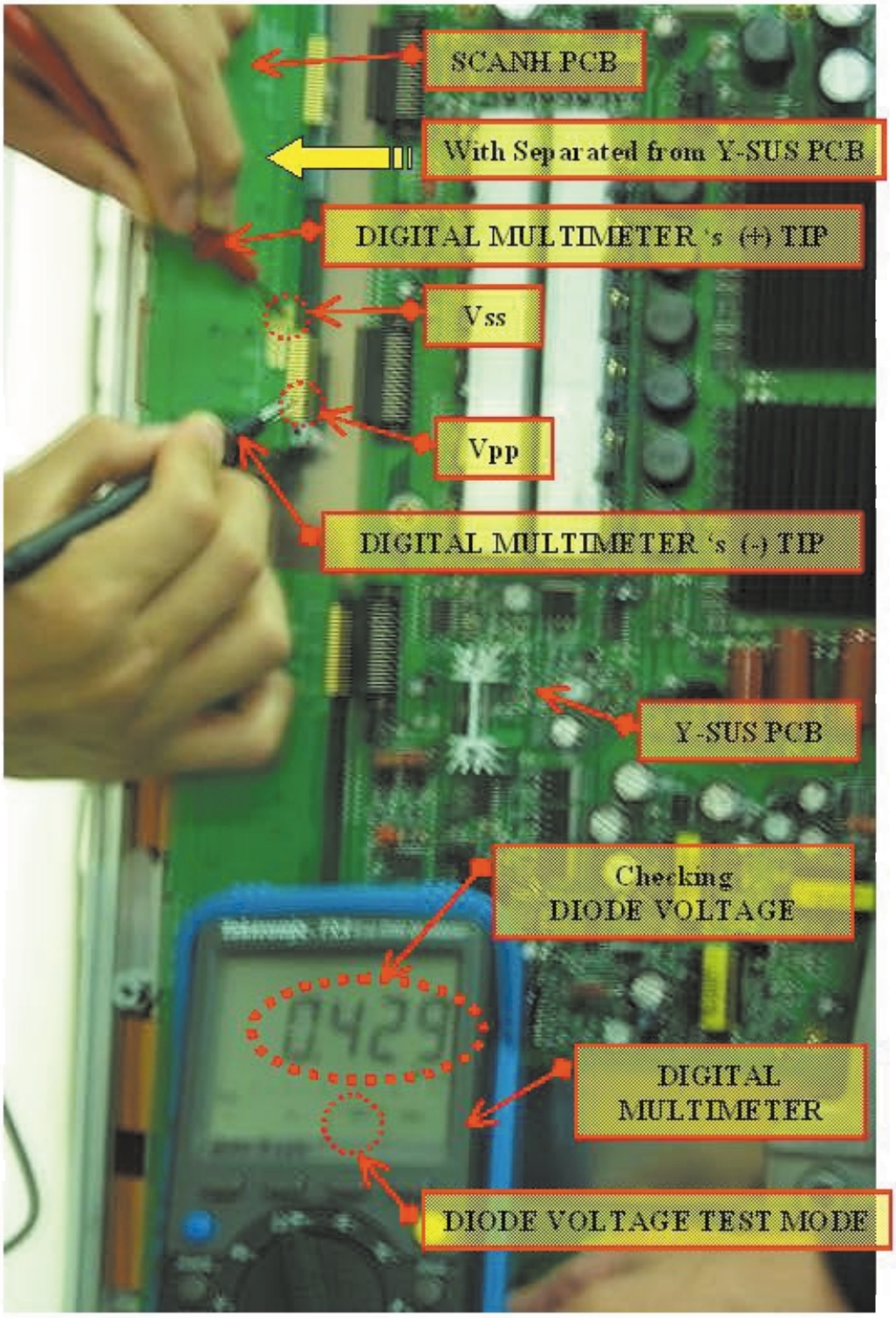
FIG<21> POWER HIGH VOLTAGE SWITCH



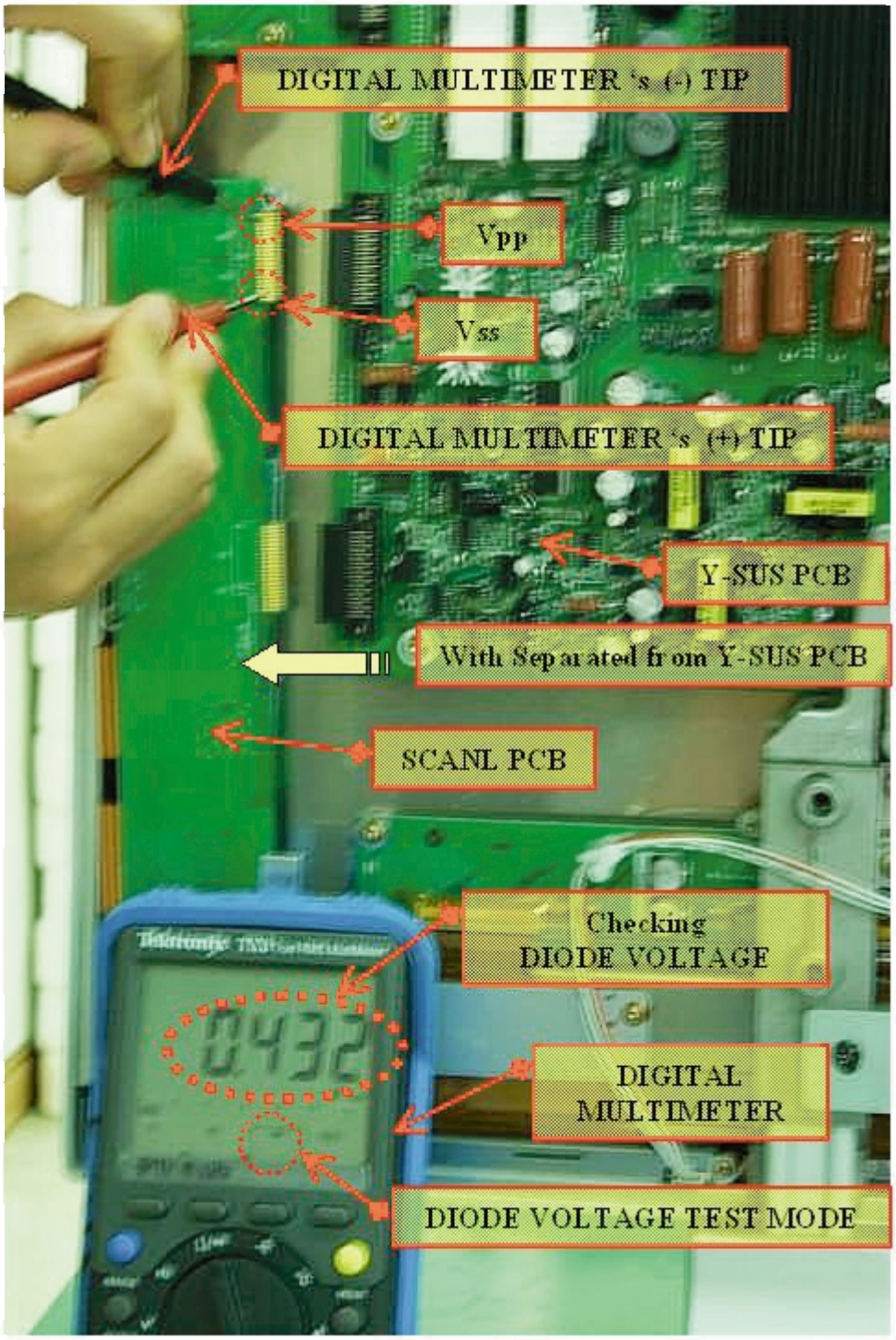
FIG<22> HOW TO ADJUST VOLTAGE



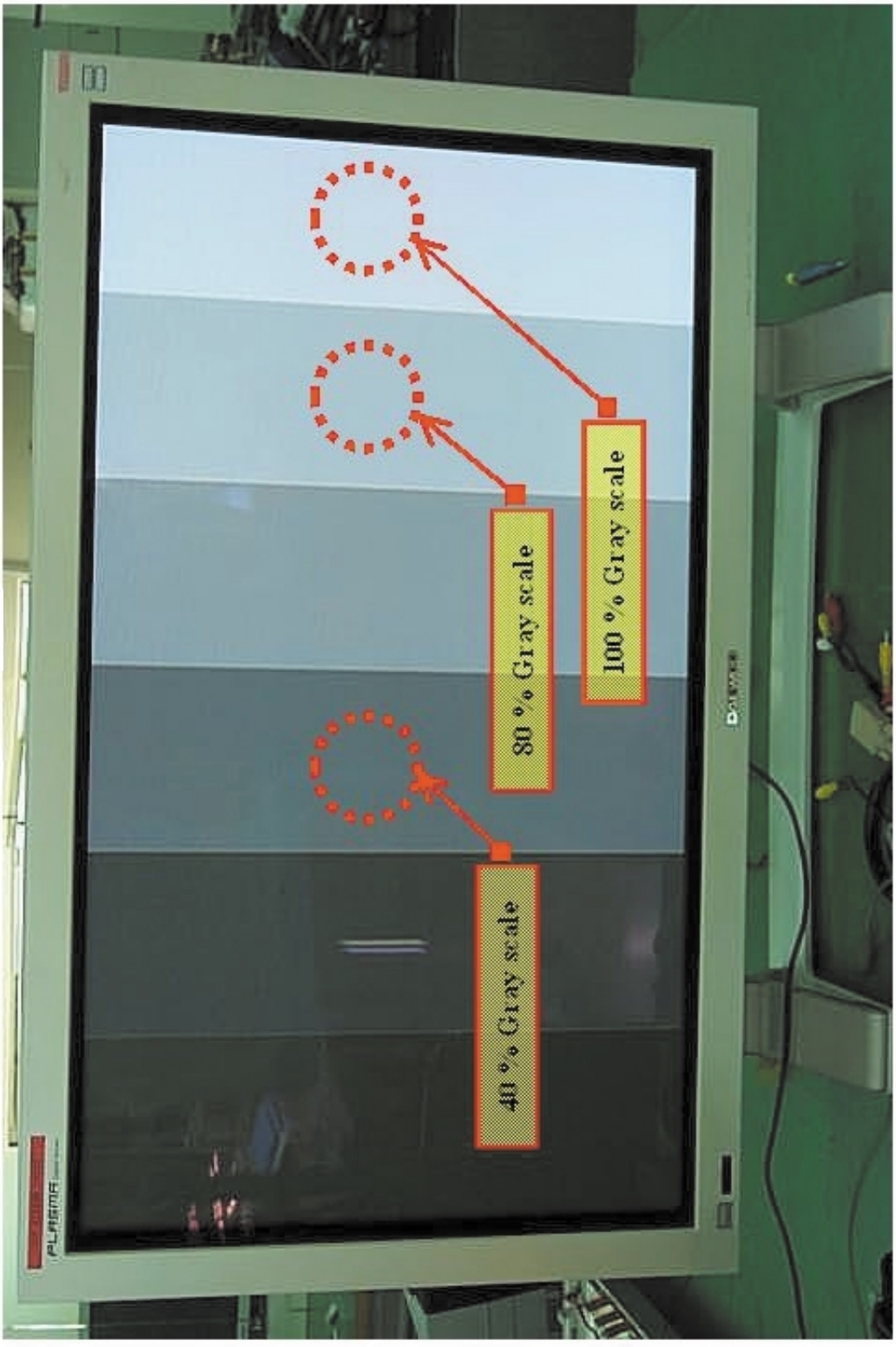
FIG<23> Y-SUS & SCAN PCB DIODE TEST



FIG<24> SCANH PCB DIODE TEST



FIG<25> SCANL PCB DIODE TEST



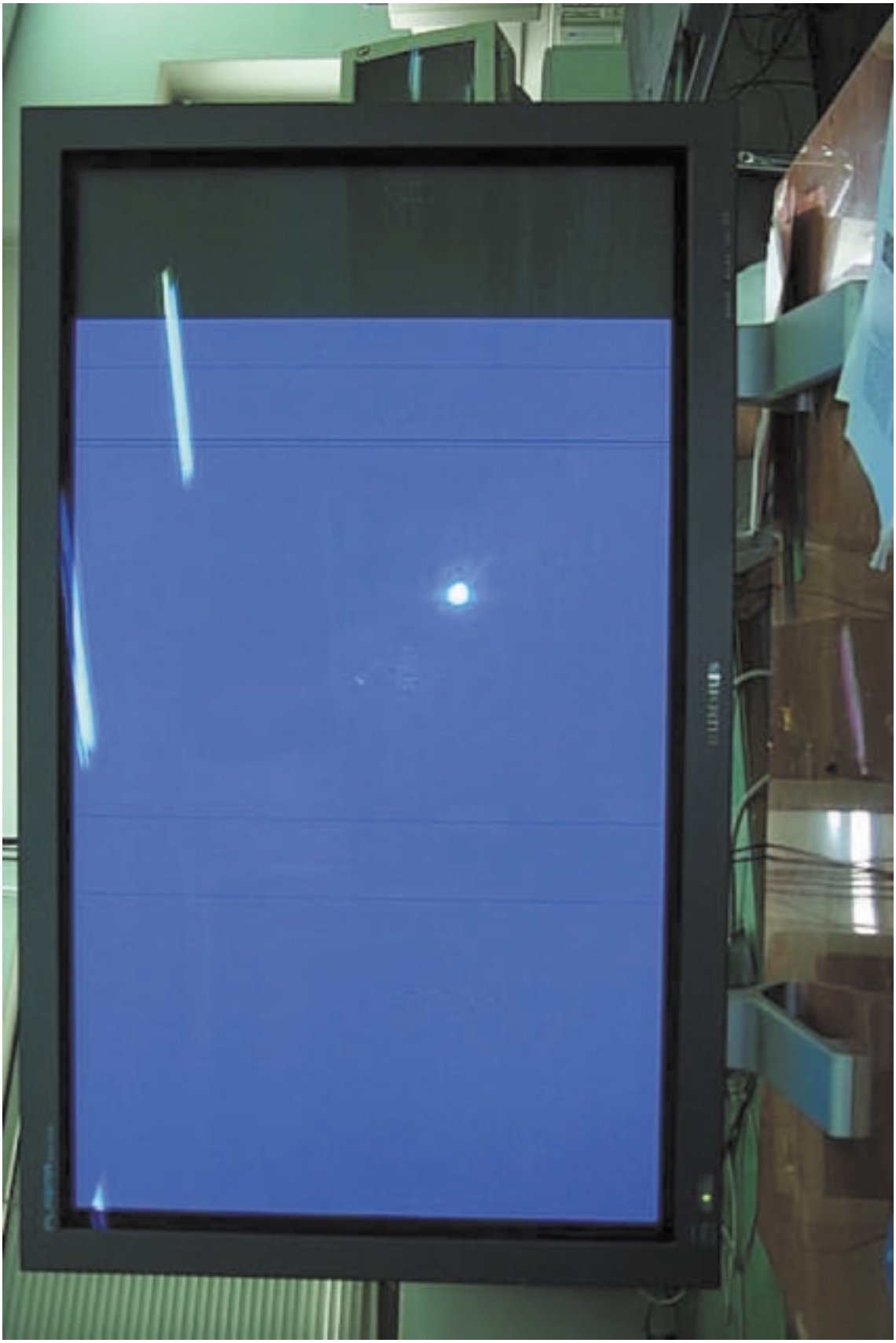
FIG<26> 5 STEP GRAY SCALE PATTERN

14. Trouble Sumpton Picture

Trouble Symptom Picture<1>

Trouble Symptom Picture<2>

Trouble Symptom Picture<3>

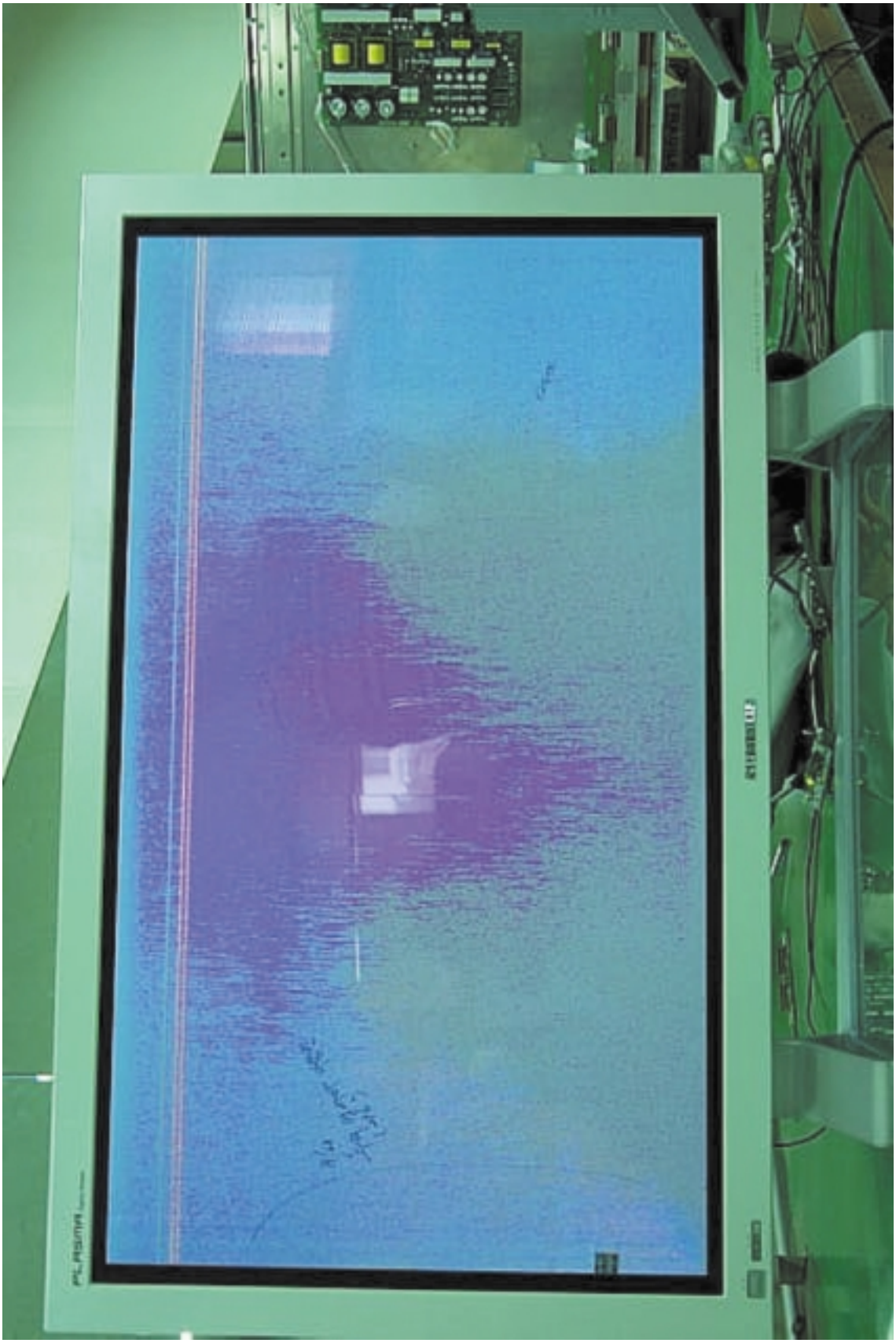


Trouble Symptom Picture<4>

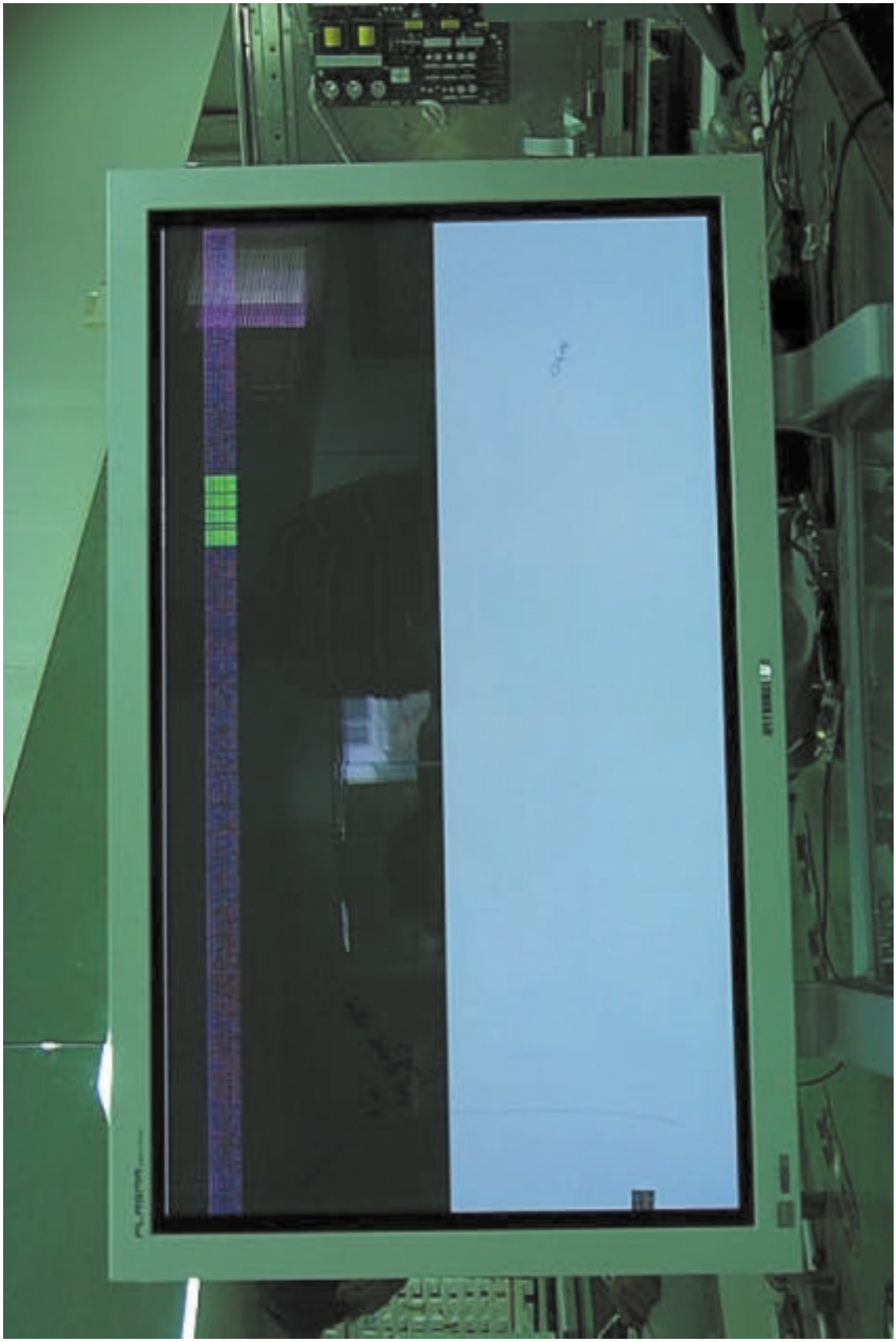
Trouble Symptom Picture<5>

Trouble Symptom Picture<6>

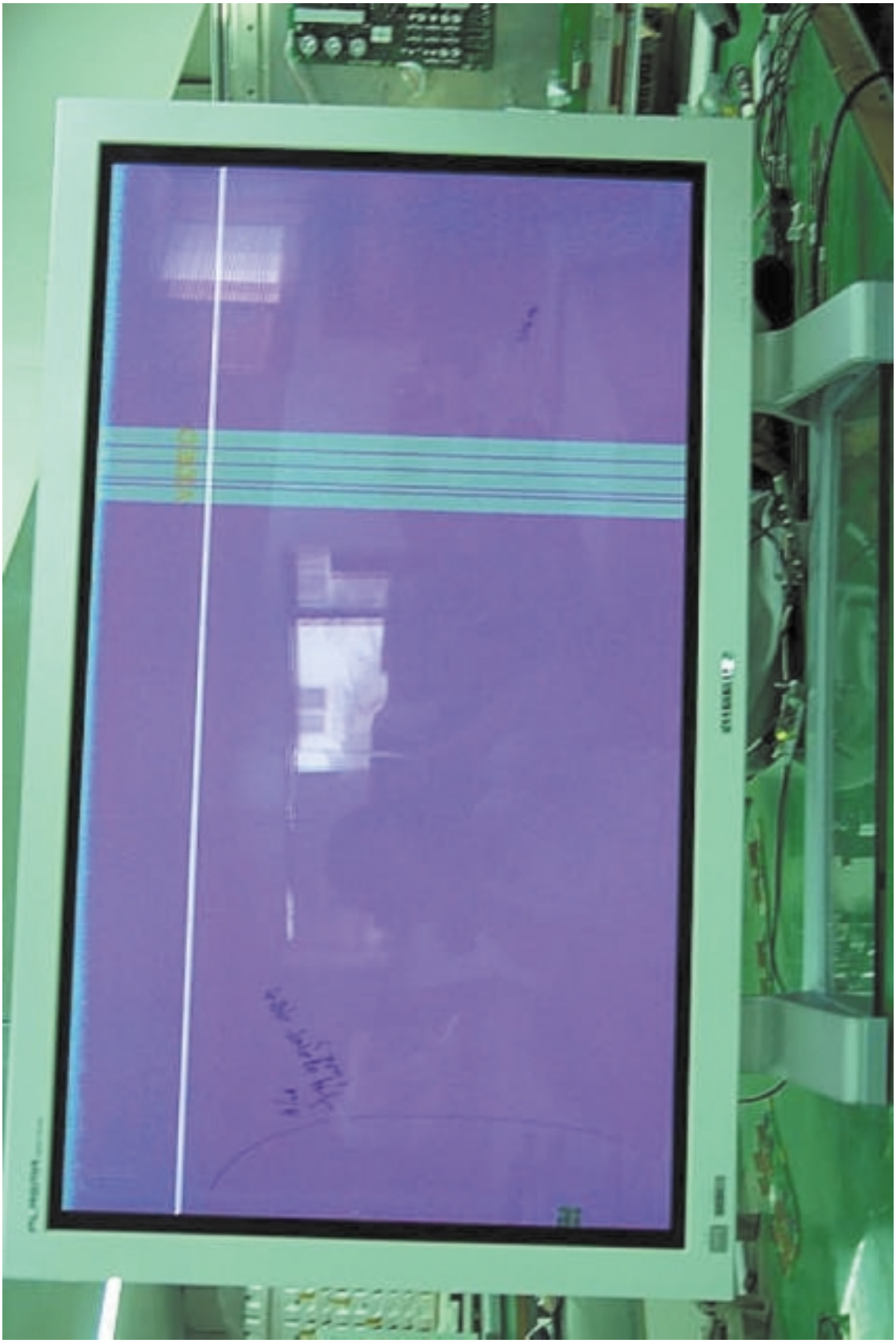
Trouble Symptom Picture<7>



Trouble Symptom Picture<8>



Trouble Symptom Picture<9>



Trouble Symptom Picture<10>

Trouble Symptom Picture<11>

Trouble Symptom Picture<12>

DAEWOO

DAEWOO ELEC TRONICS CO., LTD

686, AHYEON-DONG MAPO-GU

SEOUL, KOREA

C.P.O. BOX 8003 SEOUL, KOREA

TELEX : DWELEC K28177-8

CABLE : “DAEWOOELEC”

E-mail :djkoo@web.dwe.co.kr